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MODERN AMERICAN ENCYCLOPEDIA

PROGRESSIVELY PLANNED

VOLUME 2

1935

MODERN AMERICAN CORPORATION

CHICAGO

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MODERN AMERICAN ENCYCLOPEDIA

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Brown-Séquard (*sā-kär′*, or *sā-kwär′*) **Charles Édouard,** Franco-American physician and physiologist, was born on the island of Mauritius, in 1817. He was the son of a Philadelphia sea-captain and a French woman named Sequard. He studied medicine in Paris, and was graduated in 1840, receiving the degree of M.D. He occupied successively a professional post in London, the chair of physiology and pathology at Harvard University from 1864 to 1868, the post of lecturer at the School of Medicine in Paris, and that of medical practitioner in New York City from 1873 to 1878. Again returning to Paris, he held for a time the chair of experimental medicine at the College de France, and won a notable prize awarded by the Academy of Science. Dr. Brown-Sequard edited several medical journals, and established one in New York City. He gained distinction through his important researches in neurology and his experiments on the composition of the blood, on the muscular and nervous systems, and on the spinal cord. He died in 1894. His more important publications include *Physiology and Pathology of the Nervous System, Diagnosis and Treatment of the Lower Extremities,* and *Lectures on Nervous Affections.*

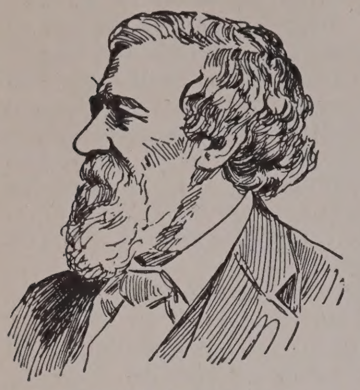
Brown University, a non-sectarian university under the auspices of the Baptist denomination, is situated at Providence, Rhode Island. It was founded as Rhode Island College at Warren, Rhode Island, in 1764. In 1770 it was moved to Providence and in 1804 named Brown University in honor of Nicholas Brown, a state legislator who contributed $100,000 to the endowment of the university. In 1897 the Woman's College was added, but remained a separate institution. The university buildings include a library of 350,000 volumes, and an observatory equipped with one of the most powerful telescopes in America. In 1933, Brown University had an endowment of $10,000,000, a faculty numbering 209, and 1,296 students.

Browne, Charles Farrar, a noted American humorist was born at Waterford, Maine, on April 26, 1834. He wrote under the pen name of "Artemus Ward." He began to study printing when but a youth, working for the *Skowhegan Clarion,* and the *Carpet Bag* in Boston, before he became a reporter for the *Cleveland Plain Dealer.* His first letter signed with the pen name he made famous pretended to be from a traveling showman, and was printed in a Cincinnati newspaper. In 1860 he became an editor of *Vanity Fair,* in New York. He gave many humorous and popular lectures. He was attacked by consumption in 1864, and when his health became better went to England in 1866 for a lecture tour. He contributed to *Punch.* He died at Southampton, England, on March 6, 1867. His personality made his lectures irresistible, but his works are chiefly important to-day for their place in the history of American literature. His chief publications were *Artemus Ward, His Book* (1865); *Artemus Ward, His Travels* (1865); and *Artemus Ward in London* (1867).

Browne, Thomas Alexander, an Australian novelist, was born in London, England, on August 6, 1826. In 1830 his father, a founder of Melbourne, Australia, took him to that country, where he was educated at Sydney College and began sheep-farming at the age of seventeen. He held the position of police magistrate and warden of Goldfields until 1895. His novels, written between 1870 and 1905, present cross-sections of Australian life in its roughest as well as its most civilized aspects. He has a vigorous style. He died in 1915. Among his more famous works are *Robbery Under Arms* (1881); *The Miner's Right* (1890); and *Old Melbourne Memories.*

Browning, Elizabeth Barrett, the greatest English woman poet, was born at Durham, England, on March 6, 1809, the daughter of Edward Moulton-Barrett, a wealthy East Indian landholder. She moved early with her family to the beautiful estate of Hope End in Malvern Hills, and after the death of her mother to Sidmouth. In 1835 the family moved to London. Elizabeth was never strong. An early injury, the bursting of a blood vessel in her lungs, and the drowning of her favorite brother in 1840, made her an invalid. At ten she could read Homer in Greek, and at fourteen wrote an epic on the *Battle of Marathon.* She published poetry in magazines, and enjoyed the society of the most gifted literary people of her time. In 1844 she published *The Cry of the Children,* an outburst against factory conditions, and *Lady Geraldine's Courtship,* which became one of her most popular poems. In 1846, against her father's wishes, she left her invalid's couch to become the bride of the famous poet Robert Browning. She went with him to Florence, Italy, where she lived the fifteen happiest years of her life. Although the Brownings visited England several times she never became reconciled with her father. A son, Robert Wiedemann Barrett Browning, called "Penini," was born to this couple, said to have exemplified an ideally happy union, in 1849. Mrs. Browning became interested in the Italian struggle for freedom, and many of her finest poems were written on that subject. The masterpiece of this poet, described as "a soul of fire in a shell of pearl," is *Sonnets from the Portuguese,* the story of her love for Browning. These poems are not only the finest of any woman writer, but among the finest sonnets in any language. Other important works are *Casa Guidi Windows,* the translation of *Prometheus Bound,* and the poem *Aurora Leigh.* Her work is distinguished for its lyrical qualities, the singing music of the lines, and a fearless and frank way of speaking, unusual among women writers at that time. She died in Florence, Italy, on June 30, 1861. The city placed a tablet inscribed to her memory.

Browning, Robert. It is unfortunate when the work of a gifted poet is the subject of controversy, for it delays general understanding and acceptance of his message. Many of Browning's warmest admirers admit that the early



ROBERT BROWNING

Browning Societies claimed too much for him, and created a wide impression that he was difficult. He had certain obscurities of style, it is true, but these were magnified by the idea that they concealed a profundity of thought whose beauty could be comprehended only by the intellectually elect. This discouraged spontaneous reading. Now it is beginning to be understood that Browning's message was simple and direct, and to all mankind that struggles and strives after moral good. Through the poets that immediately preceded him we learned to look for God in nature, the spiritual solace and growth to be found in keeping close to simple, natural things. Browning spent a half century in teaching the uplifting power of human life and work—the beauty of sublime faith, dauntless courage and deathless love to lift us to heights unattained and give us thence the farther vision into the world beyond.

This subtlest seer of the soul, as he has been called, was born in a suburb of London, May 7, 1812, and was brought up in that human maelstrom, surrounded by it, a part of it,—conscious of the swarming millions with their problems and desires. The son of a man in banking and wealthy, he was almost as obscure as if he had been poor, for he was outside the aristocracy of birth, outside the established church, outside every thing that claims distinction in social and intellectual life in England. Where many men of sensitive imagination see only confusion and discouragement in such a hive of commercial activity, Browning saw hope and order. An optimist, he believed in the enthronement of man above time and circumstance. And this he taught in his earliest poems, *Pauline* and *Paracelsus.* At 33 he won an audience with *Pippa Passes.* The pretty little silk-winder of Asolo, with her simple faith and happy heart expressed in song, triumphed over the snarls of sin and selfishness. All the world understood her "God's in His heaven; all's right with the world.'' Browning wrote other things as simple as that, like *The Pied Piper of Hamelin, Hervé Riel, How They Brought the Good News from Ghent to Aix* and *Home Thoughts. Saul* is one long, sustained drama of optimism in a royal setting; *Bells and Pomegranates* and *Men and Women* contain matchless lyrics, sensuous, impassioned, dramatic.

The most tender of all Browning's poems were addressed to his wife, Elizabeth Barrett Browning, herself a poet of distinction. Their brief life together in Italy is one of the world's most precious love stories. He outlived her 28 years and wrote his greatest work, *The Ring and the Book*, after her death. The last poem he wrote expressed the belief that he should "clasp thee again, O thou soul of my soul, and with God be the rest." He died in Venice December 12, 1889, and was buried in Westminster Abbey, London. Professor Edward Dowden, one of his biographers says: "Much of Browning's work, as much of Wordsworth's, is below what is characteristic. Those things will survive that are inspired by the permanent passions and endearing interests of humanity." William Sharp says: "It is as a poet that he will live, not as a novel thinker in verse. He had an enormous influence on the spiritual and mental life of his day, an influence that continually shapes itself to wise and beautiful issues." See *Life and Works* by Prof. Edward Dowden and *The Poetry of Robert Browning* by Rev. Stopford Brooke.

Browns'ville, Texas, a city, the county-seat of Cameron County and a port of entry, situated on the Rio Grande River, opposite Matamoros, Mexico. Brownsville was settled in 1848, and five years later incorporated as a city. It is in a busy stock-raising district, and has a large trade with Mexico. The region in which the city is situated was, after the year 1845, claimed by the Mexicans. This helped to bring on war with the United States, our government stationing a garrison at Fort Brown, adjoining the city, throughout the duration of the rupture with Mexico. Four miles from Brownsville the battle of Resaca de la Palma was fought in May, 1846, the issue being the flight of the Mexicans in a state of panic. In September, 1859, a Mexican raiding party captured Brownsville, but it was recovered by General Banks in November, 1863. The city has grown since, and to-day has some fine public buildings, including the county court-house, United States custom-house, a Roman Catholic cathedral, college and convent. Population, 13,163.

Bruce, James (born 1730, died 1794), a famous Scottish traveler, called the Abyssinian, early gave up business to travel through Europe. In 1768 he went to Algiers as consul-general, and there studied the oriental languages and also the art of medicine. He traveled through Tunis and Tripoli, studied at Aleppo in Syria, spent some time at Alexandria, and finally set out from Cairo on foot to explore the headwaters of the Nile. In November, 1770, he reached the sources of the Abawi, then supposed to be the main stream of the Nile. He spent about two years in Abyssinia.

and afterward returned to Alexandria by way of Senaar and the desert of Assuan. He published so many strange things about the manners and customs of the Abyssinians, that they were not believed at the time; but recent explorations have proved their truth. His *Travels to Discover the Sources of the Nile* was published in 1790.

Bruce, Robert, the most heroic of the Scottish kings, son of the Earl of Carrick, was born July 11, 1274. One of the several claimants to the throne of Scotland, Bruce at first took no part in the struggles of William Wallace to free his country from the English power. At last, however, he joined the final rising against the English king, Edward I, beginning his career by the murder of the Red Comyn, one of his rivals, in a fit of passion, because he suspected him of betraying their plans. He laid claim to the throne and was crowned king, but for many years he was an outlaw in his own kingdom, taking refuge in the fastnesses of the mountains, and hiding at one time in an island off the coast of Ireland, while he was thought to be dead. The story is told of him that one day, while lying in bed in a wretched hut, he saw a spider trying to spin its web from beam to beam over his head. Six times it tried and failed, just as many times as Bruce had been beaten by the English. "If the spider tries again," he thought, "so will I." The spider tried once more, and was at last successful. So Bruce determined to try again. He landed once more in Scotland, won several victories, and the death of the energetic Edward I, and the accession of his unwarlike son gave him a chance to recover his lost ground. He won back one castle after another, and at last the great battle of Bannockburn, which was to decide the liberty of Scotland, was fought June 24, 1314. The Scotch spent the night before the battle in fasting, and in the morning Bruce opened the battle by a single combat with a powerful English knight. His victory fired the hearts of his men, and, although less than a third the number of their enemies, they utterly routed them. Later he attacked the English on their own ground and compelled them to recognize him as lawful king of an independent Scotland. He died in 1329, at the age of 55, of leprosy. James Douglas tried to carry his heart to Jerusalem and bury it there, as King Robert had requested, but was killed in Spain while fighting against the Moors. The heart was brought back to Scotland and buried in the monastery of Melrose. The king's body was buried in the abbey church of Dunfermline, where his bones were discovered in 1818, when the foundations were being cleared out for a new church. His son, David II, succeeded him.

Bruchesi, The Most Reverend Louis Paul Napoleon, Archbishop of Montreal, born in Montreal in 1855. Studied theology in Paris and Rome. Ordained in Rome in 1878. Became a professor in Laval University. For years chairman of the Catholic school-board of Montreal. Appointed archbishop in 1897.

Bruges (*brṳ'jĕz*—Fr. *brüzh*), a city of Belgium, capital of West Flanders, is situated about eight miles from the sea, with which it is connected by three canals. Named from its many bridges, it is famous more for its ancient prominence than for its present prosperity. It dates from the 3rd century, and in the 12th century it was the center of the world's traffic. Commercial agents from seventeen kingdoms resided here, and no less than twenty ministers from foreign courts had mansions within its walls. At this period its population numbered upward of 200,000. Political troubles and religious persecutions subsequently ruined its prosperity. Many of its traders and manufacturers settled in England, and it is only during the present century that its greatness has begun to return. Its population is now about 54,015. It has a number of manufactures of lace, woolens, etc. Among its buildings is Les Halles, a market, with a famous belfry, 353 feet high, and possessing a chime of forty-eight bells regarded as the finest in Europe. Longfellow's poem has made this belfry well known. The church of Notre Dame has a spire 442 feet high and many valuable paintings, carvings and statues. Caxton, the famous printer, lived thirty-five years in Bruges.

Brumaire (*brṳ'mâr*), (meaning, foggy winter month—November), **The Eighteenth,** in the year VII, according to the calendar of the French Revolution, was a day famous in French history. It corresponds to November 9, 1799. On that day was begun the movement which overthrew the government of the Directory, which had been set up five years before, and made Napoleon Bonaparte first consul and finally emperor of France.

Brunelleschi (*brōō'nĕl-lȧs'kê*), **Filippo,** (born 1377, died 1446), one of the greatest Italian architects, was a native of Florence. His most famous work is the dome of the cathedral of Santa Maria dei Fiori at Florence. It is the largest dome in the world, and was used by Michael Angelo as a model for that of St. Peter's. He made the designs for the Pitti Palace, which gave rise to the beautiful style of Tuscan palace architecture in the 15th century.

Brunhilde. See NIBELUNGENLIED.

Brunn (*brun*), formerly a city of the Austrian empire, now of Czecho-Slovakia, at the junction of the Schwarzawa and the Zwittawa. Though its appearance is in many respects like an ancient city, it has numerous modern improvements. The state theater, opened in 1882, was the first theater on the continent lighted by electricity. As a manufacturing town, its wools are especially famous. Back of the city, on a height of 984 feet, rises the castle of Spielberg, where the unfortunate Italian author, Silvio Pellico, was imprisoned from 1822 to 1830. The population numbers 109,346, almost half of whom are Czechs.

Bru'no, Giordano, an Italian philosopher who lived during the last half of the 16th century. Concerning his parents and the date of his birth almost nothing is known. His life was spent largely in lecturing in many of the principal cities of western Europe, including Padua, Geneva, Paris, London, Oxford, Wittenberg, Prague. His chief service lies in the energetic and successful war which he waged against the scholasticism of his times, and in particular against the lifeless physics of Aristotle.

A contemporary of Tycho Brahe and Kepler, he expanded the system of Copernicus and prepared the way for Galileo. Even from these few lines, it will be evident that he was just the type of man which the Inquisition was looking for. At the hands of this institution he received the verdict of "guilty," in February of 1600. Punishment was prescribed in the following customary hypocritical sentence: *Ut quam clementissime, et citra sanguinis effusionem puniretur*, "to be punished with the utmost clemency and without shedding of blood." He was accordingly burned at the stake in Rome on the 17th of February, 1600.

Bruns'wick, Duchy of, a state of northern Germany, made up of three larger and five smaller distinct parts. Its total area is 1,424 square miles, considerably larger than Rhode Island, and its population is 485,958, most of whom are Saxons and belong mainly to the Lutheran church. The country is rich in minerals, and agriculture is the chief occupation of the people. The capital is the city of Brunswick, population, 136,397. Brunswick was a part of Saxony under Charlemagne, but in 1235 it became a duchy. It now holds the ninth place among the states of the German empire.

Brunswick, Ga., a city, the county seat of Glynn County, in the southeast part of the State, on St. Simon's Sound, about nine miles from the Atlantic, with a commodious and safe harbor. It is reached by the Southern Railroad, the Plant System and the Seaboard Air Line, and lies about 90 miles south-southwest of Savannah. It is also reached by steamships plying from Boston and New York. The place was settled early in the 18th century by James Oglethorpe, and is a favorite summer and winter resort, made attractive by its historic interests and many attractions, including St. Simon's Island, Cumberland Island (where sleeps Light-Horse Harry Lee), the Carnegie Dungeness Castle and the Jekyl Island Club. Its exports embrace oysters (canned), vegetables (also canned), besides cotton, phosphates, tar, rosin, turpentine and pine lumber. Population, 17,000.

Bruns'wick, Germany, the capital of the duchy of Brunswick, is situated on the Ocker, 143 miles southwest of Berlin. Founded in the 9th century by Bruno, duke of Saxony, it was enlarged by Henry the Lion and became an important member of the Hanseatic League. It has annual fairs of some importance and a large trade The ducal palace is a fine modern building, and there are a number of picturesque old structures. The museum is valuable. Population, 143,534.

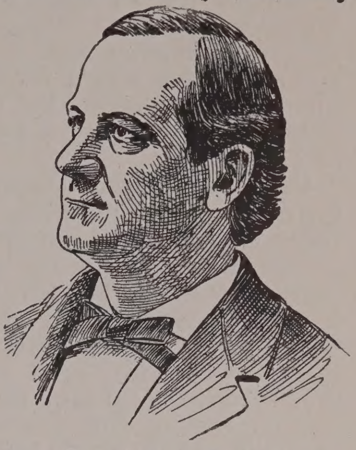
Brunswick, Me., a town in Cumberland County, at the head of navigation on the Androscoggin River and on the Maine Central Railroad, opposite Topsham, and nine miles west of Bath. It possesses good water-power for its many manufactures, which include cotton goods, wood pulp, flour, wooden-ware, etc. Bowdoin College is located there. The town was settled early in the 17th century. In early times it was known as Pejepscot, a local history of the region being published at Boston in 1878. Population, 8,200.

Brussels (*brŭs'sĕlz*), the capital of Belgium and one of the finest cities in Europe, lies on the River Senne. Railroads connect it with the principal towns of Belgium and with France, Germany, and Holland. The lower town, although it contains some fine old churches and some specimens of Gothic architecture, is mostly given up to trade. The upper town is the newest part of the city, and has the finest residences and public buildings, including the king's palace, the chief hotels, residences of foreign ministers, etc. The new palace of justice is a magnificent structure. The old city-walls have been turned into boulevards, and there are a number of noteworthy squares or places, as they are called, such as the Place Royale, with a colossal monument of Godfrey of Bouillon; the Grand Place, where in the 16th century the patriot counts, Egmont and Horn, were beheaded by order of the Spanish Duke of Alva; and the Place of Martyrs, where a memorial has been built to those who fell in the revolution of 1830, by which Belgium became independent. A picture gallery, museum and public library are contained in the Palace of the Fine Arts, and there are a large university and several academies. Besides being the seat of government, Brussels is one of the chief centers of the industry of the country. Its lace is particularly famous; but of the so-called Brussels carpets, only a few are made here, the larger part being manufactured at Tournai. A great world-exhibition was held here in 1888. Population, 665,806. In 1914 it was captured by the Germans.

Bru′tus, Lucius Junius, a Roman patriot, who lived about 500 years B. C. According to the old story, he was the nephew of King Tarquin the Proud, and, to escape the fate of his father and brothers, who had been put to death by the king, he feigned stupidity, from which he got his name Brutus. He once went with the sons of Tarquin on a mission to the oracle at Delphi and when they were told that the one who first kissed his mother should rule, Brutus, as he landed in Italy, pretended to stumble and kissed the earth, the common mother of all. The treatment which the noble Lucretia received from the son of the king was the signal for a rising to throw off the kingly yoke, and Brutus, laying aside his mask, led the people in an insurrection which put an end to the monarchy. Brutus was chosen one of the first consuls, and when his sons took part in a plot to bring back the Tarquins, he condemned them to be scourged and beheaded, and saw the sentence executed. He was finally killed in battle against the enemies of his country's liberty. A public funeral was voted, the women wore mourning for a year, and a brazen statue, with a drawn sword in its hand, was raised to his memory.

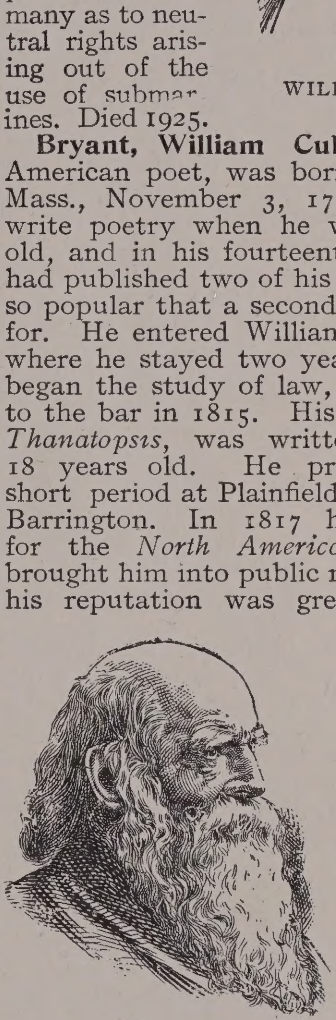
Bru′tus, Marcus Junius, one of the assassins of Cæsar, was born in 85 B. C., and died 42 B. C. He joined Pompey in his war against Cæsar; but after Pompey's defeat he was kindly treated by Cæsar, and made governor of Cisalpine Gaul. In 44 B. C., in his eagerness to preserve the liberty of the republic against Cæsar's apparent purpose of being made emperor, he was persuaded by Caius Cassius to join a conspiracy, and helped in his assassination, although Cæsar had given him many honors and promised him others. The people, instead of rejoicing at Cæsar's death, were enraged, and Brutus fled from Rome. Soon after, he and Cassius were defeated at Philippi by Antony and Octavius. He at once flung himself upon his sword and died. He was an earnest student, and something of a philosopher.

Bry′an, William Jennings, was born at Salem, Ill., March 19, 1860. He graduated from Illinois College in 1881, studied law at Chicago, and began practice in Jacksonville, Ill. In 1887 he removed to Lincoln, Neb. In 1890 he was elected to Congress, and was re-elected in 1892. Here he took position as a strong debater and brilliant orator. In 1896 he was nominated for the presidency by the Democratic party, on a free-silver platform, but, after a hard contest, was defeated by William McKinley, the nominee of the Republican party. In 1900 he was again the standard bearer of his party, and was again defeated by McKinley. In 1908 he again led his party, in opposition to Taft, but was defeated. In 1913 he was appointed secretary of state but resigned in 1915 owing to disagreement with President Wilson in a dispute with Germany as to neutral rights arising out of the use of submarines. Died 1925.



WILLIAM J. BRYAN

Bryant, William Cullen, a celebrated American poet, was born at Cummington, Mass., November 3, 1794. He began to write poetry when he was but ten years old, and in his fourteenth year his friends had published two of his poems, which were so popular that a second edition was called for. He entered Williams College in 1810, where he stayed two years, after which he began the study of law, and was admitted to the bar in 1815. His well-known poem, *Thanatopsis*, was written when he was 18 years old. He practiced law for a short period at Plainfield and then at Great Barrington. In 1817 he began to write for the *North American Review*, which brought him into public notice; and in 1821 his reputation was greatly increased by the publication of a volume of poems. He went to New York in 1825 and engaged in editorial work, and the next year became connected with the *Evening Post*, becoming chief editor a short time after. In 1832 a complete edition of his poems was printed, which made his reputation in England as great as it already was in America. He visited Europe several times, and studied the language and literature of several countries. The volume, *Letters of a Traveler*, was written soon after his return from one of these trips, and his letters to the *Evening Post*, afterward collected under the title, *Letters from Spain and Other Countries*, were written during another journey. In 1863 a small volume of new poems was published, and in 1870 and 1871 appeared



WILLIAM CULLEN BRYANT

his translation of Homer's *Iliad* and *Odyssey*, in English blank verse. He was often called on for addresses, and a volume of his *Addresses and Orations* was issued in 1873. He died at New York, June 12, 1878. His poems are noted for their delicacy yet vigor of expression, for their beautiful interpretation of nature and for their depth of thought.

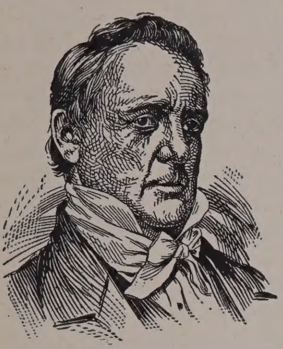
Bryce (*brīs*), **Rev. George,** is head of the faculty of the University of Manitoba, lecturer there in biology and geology, and a professor in Manitoba College. He was born at Mount Pleasant, Brantford, Ont., April 22, 1844, and was educated at the Brantford high-school, the University of Toronto and at Knox College in Toronto, taking many prizes and medals during his course, and becoming examiner in natural history in the University in 1870. In 1871 the general assembly of the Presbyterian Church in Canada selected him to proceed to Manitoba and there organize a church and college. He thereupon organized Manitoba College in 1871, Knox Church in 1872, was one of the founders of the University of Manitoba in 1877, and was moderator of the general assembly of the Presbyterian Church in Canada in 1902–3. More than sixty churches have been opened in Manitoba through the influence of the Rev. Mr. Bryce, who, in addition to many magazine articles, has published *Manitoba, Infancy, Progress, and Present Condition* (1882), *Short History of the Canadian People* (1887), *The Apostle of Red River* (1898), *Remarkable History of the Hudson's Bay Company* (1900), and edited *Makers of Canada* (1903) this last a series of volumes.

Bryce, Viscount James, an English statesman, a Liberal in politics and a distinguished author, was born at Belfast, Ireland, in 1838, and educated at Glasgow and at Oxford. At the latter university he was appointed in 1870 regius professor of civil law, resigning the post in 1893. In 1880 he entered Parliament and six years later (while representing Aberdeen), he became under-secretary of state for foreign affairs in Mr. Gladstone's administration. He also held the offices of chancellor of the Duchy of Lancaster and president of the board of trade. He was (1907-12) ambassador from Great Britain to the United States. He was a voluminous writer, his two most important works being *The Holy Roman Empire*, since become a classic, and his admirable and authoritative survey of *The American Commonwealth.* His other works embrace a narrative of a journey in Asiatic Russia, entitled *Transcaucasia and Ararat; Two Centuries of Irish Hisory* (as editor); and an important book giving his *Impressions of South Africa.* Bryce was for years one of the chief supporters of Home Rule and always took a deep interest in Irish questions, in the extension of rural local government, in the reconstruction of the second chamber, in the development of secondary education and in the condition of the eastern Christians and their emancipation from Turkish misrule. But probably his chief claim to fame was as interpreter of America to England and of England to America. He died 1921.

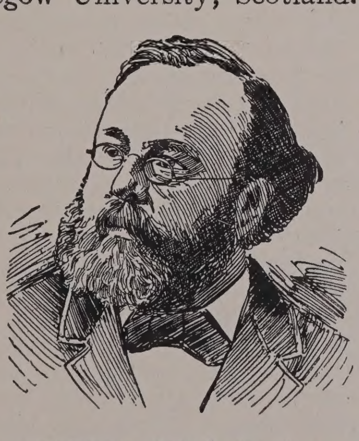
Bryophytes (*brī-ō-fī'tēz*), one of the four great divisions of the plant kingdom. It consists of two great classes, known commonly as liverworts and mosses. Of these two classes the liverworts are the more primitive, and have been derived very probably from the Green Algæ (*Chlorophyceæ*), and in turn have given rise to the mosses. In the *Bryophytes*, alternation of generations (which see) appears for the first time very distinctly. The gametophyte is the leafy plant upon which the antheridia and archegonia are borne. The egg developed within the archegonia is fertilized, and its germination produces the sporophyte, which in this case is a leafless structure, and is commonly known as the fruit of the moss. *Bryophytes* are distinguished from *Thallophytes*, the group below them in rank, not merely by the distinct alternation of generations, but also by the fact that they have a much more complex body and the female organ is always an archegonium. The group is also distinguished from the *Pteridophytes*, which are next above them, by the fact that the sporophyte is simply a leafless affair, and also by the fact that they have no vascular or woody system of tissues. See HEPATICÆ and MUSCI.

Buccaneers, the famous adventurers of the 16th and 17th centuries, who plundered the West Indies and the Spanish colonies of South America. They were mostly English and French, and were united by a common enmity against the Spaniards. Their first stronghold was on the little island of Tortugas; but later the French buccaneers established themselves in San Domingo and the English in Jamaica. They formed themselves into an association, with a code of laws. They went out in bands of fifty or more in boats, and attacked and plundered the Spanish ships as they returned from the colonies to Europe, loaded with treasure. Later on, they grew bolder and went in much larger numbers against fortified towns. The Frenchman, Montbars, named from his fierceness the exterminator, and the Welshman, Henry Morgan, were among the most famous leaders. The plundering of Vera Cruz and of Cartagena was among the most noted exploits of the buccaneers.

Buchanan (*bŭk-an'an*), **James,** fifteenth president of the United States, was born at Stony Batter, Pa., in 1791, his father having emigrated from Ireland in 1783. He was admitted to the bar in 1812, and soon obtained a fine practice. In 1821 he was elected to Congress, and remained there ten years. In 1831 he was sent by President Jackson as minister to Russia, where he made the first commercial treaty between that country and the United States, which gave our merchants many valuable trading privileges on the Baltic and Black Seas. Two years later he was elected to the United States senate, of which he was a member for 12 years, until 1845. Here he was an active and able supporter of the doctrines and measures of the Democratic party, as well as a strong upholder of slavery and the rights of the separate states. When President Polk was elected, he made Buchanan secretary of state; and under President Pierce, he was appointed minister to England. In 1856 he was elected president. During his administration a Mormon rebellion in Utah was quietly settled. In the last year of his administration the trouble between the north and the south came to a head, and in December, 1860, South Carolina withdrew from the Union. The president declared that Congress had no power by the constitution to prevent any state from withdrawing if it wished and that the president could not treat with the representatives of any state, but must refer the matter to Congress. Soon afterward, Lincoln was elected president. Buchanan spent the remainder of his life at his home in Lancaster, Pa. In 1866 he wrote a book to defend his administration. He died in 1868.


JAMES BUCHANAN

Buchanan, Robert, an English poet, novelist, critic and literary free lance, was born in Staffordshire, England, in 1841, and educated at Glasgow University, Scotland. His early work appeared when he was a journalist and won him considerable fame, especially two volumes of verse entitled *Undertones* and *London Poems.* His other poetical writings include *A Lyrical Drama; The Drama of Kings; Ballads of Love, Life and Humor; The City of Dreams;* and *The Wandering Jew.* His chief novels are *A Child of Nature; God and the Man; Come Live with Me and be My Love;* and *The Shadow of the Sword.* He also wrote a bright *jeu d'esprit,* entitled *St. Abe and His Seven Wives.* He also issued a number of dramas and popular plays. His biting pen, as a critic and essayist, made him many enemies; though the good in him, on the other hand, won him many warm friends. He died June 10, 1901.


ROBERT BUCHANAN

Bucharest (*bo͞o′kȧ-rest′*), the capital and seat of government of the kingdom of Rumania, which, since 1861, includes the now united principalities of Wallachia and Moldavia, stands on the plain of the small river, Dambovitza. The city has a number of handsome buildings. A university is situated here, and there is a large trade centering in Bucharest between Austria and the Balkan Peninsula. There is an unusual number of cafés and gambling houses; and the presence of all the vices and few of the refinements of Paris has given Bucharest the reputation of being the most wicked capital in Europe. The city has been the scene of many military operations, and has suffered from floods, earthquakes and pestilences. The population is 300,000.

Buck, Dudley, an American organist and composer, who has achieved fame for his song music, operettas and fine organ compositions, was born at Hartford, Conn., March 10, 1839, and received his professional education at the Leipsic Conservatory of Music. For several years he was organist at the Music Hall, Boston, and latterly organist of Holy Trinity Church, Brooklyn and director of the Apollo Club. He wrote a number of admired songs, cantatas and festival hymns, besides several long compositions, especially his *Golden Legend,* based on Longfellow's well-known poem with that title. He died Oct. 6, 1909.

Buckeye (genus *Æsculus*), a group of trees distinguished by large winter buds; conspicuous flowers in pyramidal racemes; leaves large, compound and opposite; large nuts the fruit. In all the buckeyes the leaflets are branched at the end of the stem. There are eleven species, four native to this country. One very well known is the Ohio buckeye, once so abundant in Ohio as to give the state the name Buckeye, and the tree the name Ohio. It is gradually becoming rare, the disagreeable odor exhaled by the bark counting strongly against it. The tree is also known as the fetid buckeye. It is found from Pennsylvania south to Alabama, west to Michigan and Oklahoma. The bitter nuts are not edible, and are poisonous to cattle. The wood is valued specially in the making of artificial limbs. The tree grows from 20, 40 to 70 feet high, has slender spreading branches, and in April and May bears small, pale yellow-green flowers.

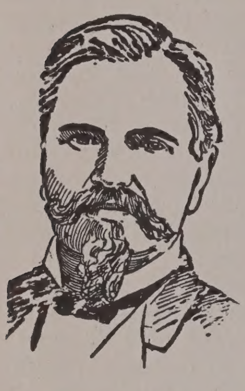
The sweet, yellow or big buckeye, has no disagreeable odor, and the nuts are eaten by cattle. It is a tall, shapely tree, and bears an abundance of showy yellow flowers. The tree grows along the Alleghanies, south to Georgia and west to Iowa.

The California buckeye grows along the western coast, is usually a small tree, and has a broad top. See Rogers: *The Tree Book;* Lounsberry: *A Guide to the Trees.*

Buck′ingham, George Villiers, Duke of (born 1592, died 1628), the son of an English nobleman, who rose to wealth and power under the Stuarts. He accompanied Charles I to Madrid in his unsuccessful suit for the hand of the Spanish princess, and made the arrangements for Charles's marriage with the Princess Henrietta of France. He involved England in war, and became very unpopular, but remained in high favor with the king. He was finally assassinated.

Buck′land, William (born 1784, died 1856), an English geologist, was lecturer for many years at Oxford on mineralogy and geology, and by his researches and writings did much for geology as a science. He practically founded the geological museum in Oxford. *Geology and Mineralogy, Considered with Reference to Natural Theology,* is one of his most popular works.

Buck′ner, Simon Bolivar, a Confederate general, was born in 1823 in Kentucky, graduated at West Point, and took part in the War with Mexico. He joined the southern army in the Civil War and became a major-general. After the war he settled in New Orleans. Returning to Kentucky, he was elected governor of that state in 1887, and in 1896 was vice-presidential nominee of the sound-money Democrats. He died January 8, 1914.


SIMON B. BUCKNER

Buck′wheat, a kind of grain, believed to be a native of Asia, called by the French Saracen wheat. It grows on poor soils and matures quickly, but is destroyed by the least frost. Its flowering season lasts for a long time, so that it is impossible for all the seeds to be at the proper stage of development when it is reaped. The seeds furnish a white flour, from which gruel is made in Germany and in Poland, and breakfast cakes in America and in England. A dark, heavy bread is also made from it in France. The flowers are rich in honey, and so buckwheat is cultivated to feed bees. Another kind of buckwheat is called Siberian buckwheat, but it is of a poor quality.

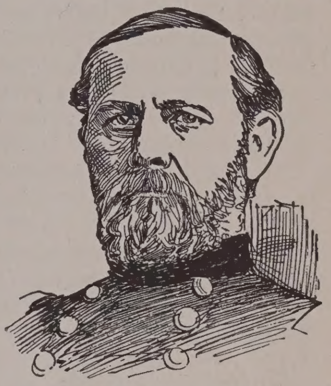
Bud, a name applied in general to an undeveloped shoot in which the axis is not elongated and the leaves overlap one another. In general, buds may be distinguished as leaf buds, which continue the ordinary growth of the stem axis, and flower buds. In the former case, the bud disappears by the elongation of the axis and the separation of the leaves. In the latter case it disappears by the opening of the flower.

Budapest (*bōō′dȧ-pĕst*), the capital of Hungary, consisting of the now united cities of Buda and Pest, situated on both banks of the Danube. Within recent years the city has become one of the finest capitals of Europe, and its growth and enterprise resemble those of our western cities. The two parts are connected by a magnificent suspension bridge. Buda is built in the form of an amphitheater around a hill, which rises 485 feet above the sea and is crowned by a citadel and a royal palace. The Blocksburg promontory rises abruptly to a still greater height. On its top is a now useless citadel, and its sides are dotted with villas. Just out of Buda, in a little plain surrounded by high hills, are the well-known bitter-water springs, which have made the name of Hungary more famous, perhaps, than any other article of export. On the other side of the river, the ancient and inner part of Pest is surrounded by a series of boulevards; while others branch out from them in straight lines to the outer environs of the city. The finest street in Budapest, and one of the handsomest in Europe, is Andrássy Street, which is two miles long. It is divided into a central driveway, with sidewalks, narrower driveways next the sidewalks, and graveled riding courses between the central and outer driveways. It connects the inner city with a beautiful park of 1,000 acres. The Margaretta island, which lies in the Danube, at the upper end of the city, two miles long and a half mile wide, is also kept as a pleasure ground. The river is lined for three miles with stone quays, leading up to promenades, along which are rows of fine buildings, broken by open parks and adorned with statues of Hungarian heroes. The city government controls many institutions which in the United States are under private companies, such as theaters, opera houses, street railways, etc. The university and special schools, the national museum, the 250 periodicals and a dozen or more daily papers published in the city are among the literary advantages of the place. All the Hungarian railroads center in Budapest, and its trade by the Danube is extensive. Next to Minneapolis, on this continent, it is the great milling center of the world. The population of Budapest is 880,371.

Buddha (*bōōd′dȧ*), the founder of the religion known as Buddhism. Although this religion has now existed for 2,500 years, and its followers are counted as more than 340,000,000, or nearly one fourth of the human race, it is only within recent years that the discovery and study of Buddhist sacred books has made known to western nations the nature and birth of this world-religion. It began about the beginning of the 6th century B. C., in the north of Hindustan. Buddha, the founder, was a prince named Siddhartha; but he is often called Sakya and Gautama. Buddha, or more properly the Buddha, is the title given him in his state of perfection, and means the Enlightened One or he to whom truth is known. This prince, as the story runs, was of a thoughtful disposition, and his father, fearing that he would desert his high position and take to a religious life, had him married to a charming princess and surrounded him with all the splendors of a luxurious court. He was, however, in spite of his surroundings, constantly brooding over the thought of old age, of loathsome sickness and death and of the unknown future after death. After twelve years passed thus, he escaped from the palace and began a strict religious life. He was now about thirty years old. He cut off his long locks, the sign of his high caste, and studied all that the Brahmans could teach him, but found no satisfaction. He sat thinking for weeks, and at last came to the conclusion that ignorance is the cause of all evil and that by getting rid of ignorance, we can be free from all miseries. After various stages of thought, he himself became free from ignorance, and attained the "perfect wisdom" of the Buddha. He began to preach this strange gospel at Benares, and for forty years traveled over northern India, making many converts. He died at Kusinagara, at the age of eighty, in the year 472 B. C.

Buddhism has now little hold in India, the land of its birth; but it has full sway in Ceylon and over the whole Indo-Chinese peninsula; it prevails in China and to some extent in Japan; it is the religion of Tibet, of the Mongolian population of central Asia and southern Siberia and of the Tartar tribes on the lower Volga. As a system of belief, Buddhism holds that existence is on the whole a curse, and so it seeks final rest, in what is called Nirvana or nothingness—non-existence. Death, however, does not bring this rest, for it leads only to another state of existence, as a person, a spirit, an animal, an insect, a plant or even an inanimate thing, according to the merit or demerit of the departed. The Nirvana is gained by eight things: right faith, right judgment, right language, right purpose, right practice, right obedience, right memory and right meditation. There are many moral precepts and directions and certain virtues which lead directly to it. The great virtue of the religion is benevolence. Buddhism knows no supreme God or Creator, and as an intellectual belief is of little value; but as a system of morals it ranks only second to Christianity. Since the time of its founder its worship has been disfigured by countless extravagant and childish forms and ceremonials.

Buell (*bū′el*), **Don Carlos,** an American general, was born near Marietta, O., in 1818. He graduated at West Point in 1841 and took part in several battles in the Mexican War, being severely wounded at Churubusco. From the era of the Mexican to that of the Civil War, he was assistant adjutant-general in different departments. After the outbreak of the Civil War, he helped for a time in organizing the army at Washington; then became commander of the department of the Ohio, and later was made major-general of volunteers. At the battle of Shiloh his forces came to the aid of General Grant, and with their help the Confederates were defeated on the second day of the battle. A few months later he was given command of the new district of the Ohio. The Confederate force under General Bragg entered Kentucky and threatened Louisville and Cincinnati. A part of this force was met by a part of Buell's army at Perryville, October 8, 1862, and an indecisive battle was fought, Buell allowing the Confederates to retreat without attempting to follow them. His command was given to General Rosecrans in the same month, and a court of inquiry was ordered to investigate his conduct, but he was acquitted. He became president of the Green River Iron Works, in Kentucky, in 1865, and died on November 19, 1898.

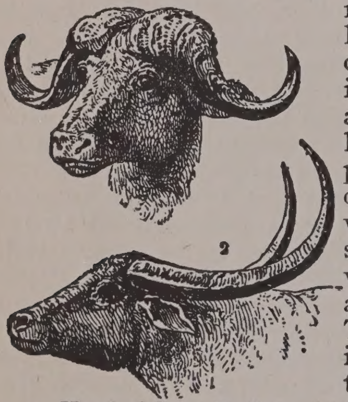


GENERAL BUELL

Buena Vista (*bwā′nȧ vĕs′tȧ* or *bū′nȧ vĭs′tȧ*), a village in Mexico, near which the American forces under General Taylor defeated the Mexicans under General Santa Anna, on February 23, 1847. Taylor had a force of 5,000 men and Santa Anna had 20,000. The American forces occupied a position which made it almost impossible for the Mexicans to make use of their artillery or cavalry. Slight skirmishes took place on February 22; but the main attack by the Mexicans began the following morning and lasted the whole day, Santa Anna being finally driven back and retreating during the night. The American loss was 746; that of the Mexicans being 2,000.

Buenos Ayres (*bō′nŭs ā′rĭz*, Sp. pron. *bwâ′nôs ī′râs*), the federal capital of the Argentine Republic, stands on the right bank of the River Plata, 150 miles from the open sea. The river here is 36 miles across, but very shallow, a difficulty which is being remedied by a vast system of harbor works. Besides the coast and foreign trade, there is a large overland traffic to Chile. The absence of any good fuel near at hand and of stones and timber for building purposes, has been a great disadvantage to the city. It is, however, being greatly built up, in modern style, and has a number of fine buildings, among them one of the finest cathedrals in South America. The six railroads, also, which have their termini here, have many of them handsome depots. There are also a university and a military college; while its extensive mileage of street railroad lines and an extensive telephone system are among recent improvements. Europe and the United States are connected with the city by cable. Buenos Ayres was founded in 1535, but was twice destroyed by the Indians. It became independent of Spain in 1810. The commerce of the country, which passes through the ports of Buenos Ayres and Montivideo, consists chiefly of wheat and other grains, mutton, sheep-skins, wool, tallow and stearine. Its estimated population is 1,900,000; population of the province of this name, 1,796,320; area, 117,777 square miles.

Buffalo. Two kinds of cattle—the Asiatic buffalo and the Cape buffalo—properly receive this name. The Asiatic form is a native of India; it has been domesticated and carried into Greece, Italy and Egypt. It is larger and more powerful than an ox. It is fond of water, and will stand for hours with only its head above the surface. The Cape buffalo is found in Central and South Africa. It grazes chiefly at night, and lies in the woods and thickets during the day. It has never been domesticated. It is very fierce and cunning, and often attacks without provocation. Its skin is so tough that it is made into shields by the Kaffirs. The so-called American buffalo is the bison (which see).



1. Head of Cape Buffalo
2. Head of Indian Buffalo

A faithful bird-friend it has, the buffalo-bird, which closely attends it, picks parasites from its hide, and gives note of alarm at the approach of danger. The Indian or water-buffalo is of great service, owing to his strength and his ability to labor in wet grounds. It is a very interesting sight to see this huge creature at work in the rice fields, his head always low down, nose thrust far in front. There are still some wild herds to be found of the Indian buffalo, the largest of all wild cattle, a very dangerous animal, able to worst a tiger in combat. The so-called American buffalo is the bison. (See Bison.)

Buf′falo, a western city of New York state, at the eastern end of Lake Erie, at the head of Niagara River. It has 37 miles of water frontage, 12 miles of which are on Buffalo River and the remainder is on the outer harbor along the lake front and on Niagara River. It has one of the best harbors on the lake, formed by the Buffalo River, the entrance being protected by an immense breakwater, 4,000 feet in length. A new harbor has also been made by the building of a breakwater in the Niagara River. The city is a desirable place of residence, especially in summer, during which the lake breezes moderate the temperature. It has a beautiful series of parks connected by broad driveways. It has nearly 200 churches and many fine public and business buildings. Its railway facilities are great, while it has the advantage of the trade of the Barge Canal. Its commerce has grown wonderfully in recent years, and it is now the fourth shipping city in the New World. The first grain elevator on the lakes was built here, and it now has 22 elevators with 25,350,000 bushels' capacity. It has 2,200 manufactories, and handles great quantities of flour, lumber, coal and mineral ores. It is supplied with natural gas, piped from Pennsylvania and from Canada, and with electric power from Niagara Falls tunnel. It has over 375 miles of street-railway and 376 miles of paved streets, including 250 miles of asphalt thoroughfares. Pure water is supplied from Lake Erie. There are a good system of public schools and several colleges and seminaries, as well as public and private libraries. The town was burned in the War of 1812 by the British and Indians. In 1901 Buffalo was the seat of the Pan-American Exposition, and the mecca for travelers and sight seers from Europe and all parts of the New World. It was here (on September 6, 1901), that President McKinley was assassinated by an anarchist. Population, 600,000.

Buffalo=Berry, a shrub with small silvery leaves, which bears red or yellow fruit the size of a currant. It is sometimes planted as an ornamental shrub. It is a native of cold, dry regions of northwestern North America.

Buffalo Bill. See Cody, William Frederick.

Buffalo=Fish, a dark colored fish with humped back and large head, found in the

Mississippi valley. It is one of the suckers, and the flesh is poor.

Buffalo-Gnat, a rival to the mosquito in bloodthirstiness, a dreaded enemy of man and beast, that ravages in the Mississippi and Missouri valleys. These gnats kill poultry and domestic animals. Their bite is poisonous and, attacking as they do in droves, causes much loss of blood. They fly and bite in the day time. The larvæ are aquatic, found on rocks and logs in swift streams.

Buffalo-Grass, a highly valued grass common in the West, from Manitoba to Texas. It is low and spreading, spreads rapidly by runners, is easily propagated and is adapted to regions of little rainfall. All stock enjoy it.

Buffalo-Moth. See CARPET BEETLE.

Buffon (*bŭf'fŭn*, Fr. *bŭf'fôn*), **Georges Louis Leclerc, Count de,** a French scientist (born 1707, died 1788). He was of a wealthy family and educated for the law; but, after traveling for a time, decided to devote himself to science. In 1739 he was elected a member of the Academy of Sciences, and appointed director of the Royal Garden. This gave him opportunity to study animals widely. His *Natural History*, in fifteen volumes, is written in the finest literary style and created a great popular interest in natural history. Rosseau is said to have kissed the steps of the pavilion in which the book was written. He was a great thinker and one of the pioneers in the modern doctrine of evolution. *The History of Birds*, *The History of Minerals* and *Epochs of Nature* are other works of his which are well-known.

Building-Material. In the mammoth structures which our modern building era has made us all familiar with, more important than ever is the necessity of having good sound material for their erection, so as to withstand the severe strain now imposed upon all departments of the builder's and constructor's work. In earlier times the erection of buildings was for the most part a matter of mere masonry, calling into exercise, in addition to the architect, the bricklayer's or stonemason's work; to-day, in this era of immense steel structures, the demands are more extensive and complicated, calling not only for materials of greater strength and endurance, as well as for increased fireproof protection, but also for elaborate plumbing, heating and ventilating arrangements, and for stone, granite, concrete or iron and steel that will resist crushing weights and defy deterioration by the changes in weather and temperature. So vast, and occasionally so elaborate, are the structures of our modern day that the building of them, under the architect's supervision, has to be undertaken not only by specialized labor, but let out to various contracting and sub-contracting firms, each responsible for its own assigned task, and turned out by the use of material either where the building is to be erected, or, more generally, in yards, workshops and factories where specialized work is made ready, as demand calls for, on a large scale, and that whether it be vaults, beams, joists, arches, balustrades, railings, baths, doors, windows, mantels, moldings, staircases, encaustic tiles, wardrobes, belts and belting, roofing material, boilers, radiators, furnaces, ranges, sinks and light and heating plant. When these rough essentials are furnished and placed, then come the plumbing, lathing and plastering operations, the fireproofing, glazing, painting, papering and general finishing and decorating,—the processes of all being well known, and the materials of which, including the skilled labor in using and applying them, should be of the best quality and the most workmanlike and satisfactory.

Bulb. In a certain sense a bulb is a bud whose leaves have become fleshy through storage of reserve food. This simply means that it is a shoot whose axis has remained short and whose overlapping leaves have become thickened. A further difference between a bud and bulb is that in the latter case it is not the whole leaf, which is thickened, but merely the leaf bases, as in the hyacinth and onion.

Bul'bel, bulbs which grow from the main bulb, or which are formed by the breaking apart of the main bulb. What is known as the potato-onion is an example of the latter phase.

Bulb'let, small bulbs which are borne in connection with the foliage or flowers. For example, "top onions" bear bulblets in the flower cluster, while the tiger lily bears bulblets in the axils of its leaves.

Bulga'ria, including Bulgaria proper, occupies a part of the Balkan Peninsula, and lies between the Danube and the Balkan Mountains, and, with Eastern Rumelia to the south, was a tributary principality of Turkey, but is now an independent nation, having declared its freedom from all interference by foreign powers in 1908, as explained farther on.

Natural Resources. With a fine agricultural country, a broad seaboard, the fine waterway of the Danube on her northern boundary, a mild climate, one of the most liberal constitutions in Europe and an energetic people, Bulgaria has great possibilities. There are few large estates and the farms, which average about 18 acres, are almost universally owned by the thrifty and industrious peasants who till them.

Occupations. There is in Bulgaria considerable agricultural and cattle raising industry; also wine-making, tobacco growing and manufactures of silk and the attar of roses.

Cities. Sofia, the capital, has a population of 102,769. The other chief towns are Varna, 41,317, a fortress on the Black

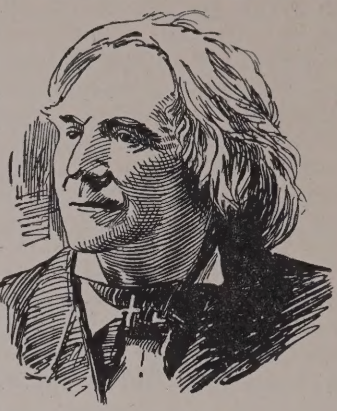
Sea, Plevna, 23,081, and Rustchuk, 35,823.

History. The present Bulgarians came in the 6th century from the banks of the Volga, overran the country and at one time ruled over Macedonia, Thessaly, Epirus and Albania; while their prince styled himself the autocrat of all the Bulgarians and Greeks, and looked forward to a great empire of Slavs. They fell, however, under the power of the Byzantine Empire and, later, under the Turks, and lost their independence. But about the middle of the 19th century a national feeling began to stir again, and literature, newspapers, and schools grew up. The Bulgarian atrocities in 1876, in which many thousands of Christians were killed by their Turkish neighbors, aroused Europe, and the next year Russia, as the assumed guardian of the Slavic races, made war against Turkey. By the treaty of Berlin, 1878, Bulgaria was made a self-governing state, but her choice of a ruler must be confirmed by the powers of Europe. Prince Alexander of Battenberg became Alexander I of Bulgaria in 1879, and in the following year Eastern Rumelia united with Bulgaria. Russia, however, grew hostile to Alexander, and he abdicated. In 1887 Prince Ferdinand of Saxe-Coburg became ruler.

In the Balkan War (q. v.) in 1912 Bulgaria combined with Servia, Montenegro, and Greece to drive Turkey out of Europe, an undertaking which met with a remarkable degree of success, but later, owing to disputes over the division of the territorial spoils of their victory, Bulgaria became engaged in a war with her former allies and was severely beaten. In the European War (q. v.), although public sentiment in Bulgaria was strongly on the side of the allies, Ferdinand's dominating influence enlisted her army on the side of Germany. In 1918, however, Bulgaria was compelled to make peace—the first of Germany's allies to do so—and Ferdinand abdicated in favor of Crown Prince Boris.

Eastern Rumelia is in many respects in advance of Bulgaria proper, as it has been longer open to influence. The production of attar of roses is one of its most valuable industries. Sofia and Philippopolis are the two capitals. The total area of Bulgaria, including both parts, is 38,080 square miles, or a little larger than Indiana, and the population of the whole principality is 4,329,108. Eastern Rumelia has a population of 1,174,535, with an area of 13,700 square miles. Philippopolis, the capital, has a population of 47,929.

Bull, Ole Bornemann, a Norwegian violinist (born 1810, died 1880). His father was greatly opposed to his studying music, but in 1829 he went to study under a musician in a German town. He became discouraged and proceeded to Göttingen to study law, but afterwards went to Paris where the celebrated violinist, Paganini, was present at his début. After a period of misfortune, he became famous as a player. He traveled through Italy, Great Britain, Russia, Germany and Norway, his reputation increasing all the time. In 1844 he came to America, and nine years later he made this country a second visit, playing to immense crowds and making a large fortune, most of which he lost in land-speculations. One of his land-schemes was the buying of a great tract in Pennsylvania, upon which he founded a Scandinavian colony, later called Oleana. The plan proved a failure, and the colony broke up. In 1869 he once more visited America. He died at Bergen, Norway, in 1880.


OLE BULL

Bull-Dog, a large-headed, strong-jawed variety of dog, of the mastiff type common in England, and used in olden days in boar-hunting and bull-baiting. Nowadays they are commonly reared as watch-dogs, or crossed with other breeds and their temper modified, as pets and faithful companions of man. In color the usual varieties are brindle, red, fawn, white or piebald; in weight they are about 50 pounds, compact in shape and thick-set. Other species include the toy bull-dog, and the French bull-dog, the latter familiar now in this country as a house dog of good disposition.

Buller, General Sir Redvers, V.C., a British officer in command of the Natal Force in the Boer War of 1899–1901, who, after many disheartening reverses, effected the relief of Ladysmith, and returned to England in November, 1900. He was born in England in 1840, and as an officer of the 60th Rifles saw much service in the China Expedition of 1860, in the Red River Rebellion (in northwestern Canada), in Ashanti and in the Kaffir and Zulu Wars in South Africa. In the war with the Boers, that broke out in October, 1899, he had chief command of the first army-corps sent from England to South Africa, and was conspicuous in the operations which led to the relief of Ladysmith. He died in England, June 2, 1908.

Bull-Fight, a Spanish amusement. It was introduced by the Moors and soon spread over all the kingdom. Each city has its arena, some very magnificent, called place of the bulls, for carrying on this sport. The bulls are let loose in the open space, one at a time. Horsemen begin the attack armed with lances, and if one of the horses is ripped up, as often happens, a crowd of footmen with red banners take up the attention of the bull, while the rider escapes. Men armed with sharp, barbed darts, with fireworks and flags attached to them, next torment the victim. Finally the main actor enters the arena clad in black, and, armed with a long, straight sword, he soon ends the sport, driving his blade up to the hilt into the bull, where the neck joins the spine.

Bulfinch, Thomas (1796–1867), the author of the *Age of Fable* (1855), a remarkable and well-written book, and of many literary and historical studies, was a native of Boston, Mass. He was a student of Phillips Exeter Academy; and a graduate of Harvard University (1814). Mr. Bulfinch was a business man and banker as well as an author. Among his works are *Legends of Charlemagne*, *Poetry of the Age of Fable*, the *Hebrew Lyrical History*, the *Age of Chivalry*, *Oregon and Eldorado* and the *Boy Inventor*. Mr. Bulfinch was an intimate friend of the poet Longfellow.

Bull Run, a small stream in northeastern Virginia, upon whose banks were fought two severe battles of the Civil War, both of which resulted in defeat to the Federal arms. The first battle of Bull Run was fought July 21, 1861, and was the first important engagement of the war. The Union army, 35,000 strong, was commanded by General Irvin McDowell; the Confederate army, numbering about 32,000, was under General Beauregard. The fight began in the early morning, and until noon the advantage was with the Federal forces, which crossed Bull Run and attempted to turn the confederate left; but in the afternoon the Confederates were re-enforced, the Federal lines gave way before the onset of fresh troops, and finally retreated in confusion and disorder. The effect of this battle was greatly to encourage and strengthen the south, while the north proceeded to prepare for a struggle which it was now seen must be stubborn and prolonged. On the same field a second and terrible battle was fought on the 29th and 30th of August, 1862, between the Confederate army under General Lee and the Union forces under Major-General John Pope. After two days' hard fighting, Pope was defeated and compelled to retreat. He charged his defeat to the tardy support which was given him by certain divisions of McClellan's army, which had been sent to him, and particularly to positive disobedience of orders by General Fitz-John Porter, who withheld re-enforcements during the crisis of the battle. Porter was afterward courtmartialed and dismissed from the service, but was later on restored.

Bülow (*bü'lō*) **Prince Bernard von,** German imperial chancellor in succession to Prince Hohenlohe, who retired in 1900 and died in the following year. Prince von Bülow was born in 1849, in Holstein, studied at Lausanne, Leipsic and Berlin. served in the Franco-Prussian War, and entered the German Foreign Office in 1874. In his early diplomatic career he was successively secretary of legation at Rome, St. Petersburg, Vienna and Paris; charge d' affaires at Athens; and secretary at the Berlin Congress. In 1897 he was named Foreign Secretary at Berlin, and as such concluded with Spain the treaty by which Germany became possessor of the Mariana and Caroline Islands. In 1899 he was created a count and in 1900 became German Chancellor, after which he was raised to the dignity of a prince of the Empire, as well as prime minister of Prussia.

Bülow (*bü'lō*), **Hans Guido von,** a German musician, born at Dresden in 1830, and died February 12, 1894. He studied law for a time, but by the advice of Wagner and Liszt decided to devote himself to the study of music, which he did under Liszt for two years. In 1855 he was made professor of the piano in the Conservatory of Music at Berlin, and later went on concert tours through Germany and Russia, gaining a great reputation as a pianist. In 1867 he became chapel-master to the king of Bavaria at Munich, and in 1880 he was made director of music to the court at Meiningen. He wrote about thirty musical works, and composed many songs and short pieces. He was one of the most successful orchestra-leaders in Europe, and as a pianist had few equals. He died at Cairo, Egypt, on Feb. 12th, 1894.

Bul'wer-Lyt'ton, Edward George Earle Lytton, Baron Lytton, an English novelist, was born in Norfolk in 1803. He belonged to a very old English family, and was educated at Cambridge University. In 1826 he wrote his first poetry for publication, and in the next year his first novel, *Falkland*, appeared. After that his writings were published in rapid succession, among the earlier ones being *Eugene Aram*, *Pelham*, *Last Days of Pompeii*, *Rienzi the Last of the Tribunes*, *Zanoni* and *The Last of the Barons*. He was also successful in the writing of dramas, *Richelieu* and *The Lady of Lyons* being the best known. He entered Parliament in 1831 and became a prominent member, being made secretary of state for the colonies in Lord Derby's cabinet in 1858. Most of his later works were first published in magazines, of which the most celebrated are *The Caxtons*, *Harold the Last of the Saxon Kings*, *My Novel*, *A Strange Story* and *Caxtoniana*, the last being a collection of essays. Bulwer considered *King Arthur*, an epic poem, his best work. His novels are very popular and have been translated into several languages. He was made a peer and given the title Baron Lytton in 1866. His death occurred in 1873. Lord Lytton's son, Robert, inherited much of his father's gifts, especially as a poet. His best known work is *Lucile*.

published under the *nom de plume* of Owen Meredith. He is also known as a statesman and diplomat, having filled the offices of governor-general of India (1878–80) and of ambassador to France (1887–91). Lord Robert Lytton was born at London in 1831, and died at Paris in 1891.

Bun'ker Hill, an historic elevation in Charlestown, now a part of Boston, Mass. It is about 100 feet high, and is connected by a ridge with another smaller hill, called Breed's Hill. These hills are where the famous battle of Bunker Hill was fought between the British and American troops, June 17, 1775. The British had possession of Boston, and Generals Howe, Clinton and Burgoyne had just arrived from England with a large body of troops. The American militia and the volunteers were encamped at Cambridge, three miles from Boston. The news had come to the Americans that General Gage was planning to fortify Dorchester Heights, and in order to prevent this 1,000 men under Col. William Prescott were sent to Charlestown on the night of June 16 to fortify Bunker Hill. General Putnam and Major Brooks joined them, and after reaching Bunker Hill without attracting the attention of the British, it was decided to throw up the breastwork on Breed's Hill instead, as it was nearer Boston. At daybreak the British sailors on the ships anchored in the harbor, descried the fortification and began firing upon it. Prescott extended the fortification by filling up with hay the space between two old rail-fences on the left of the breastworks. General Warren came up about two o'clock in the afternoon, and, refusing the command, fought as a volunteer. At the same time Colonel Stark arrived with 500 men and took up a position behind the rail-fence. Meanwhile, the British forces, under Generals Howe and Pigot, had been brought over from Boston in boats, and at half-past two the first charge was made. Prescott had ordered his soldiers not to fire until the British were so near that the whites of their eyes could be seen; and when they did open fire the British retreated in confusion. Meanwhile the town of Charlestown had been set on fire by the shot from the British ships, and, under cover of the dense smoke, Howe ordered a second attack; but again his troops were driven back. Unfortunately the Americans were by this time almost out of ammunition, and when, Clinton having come over with British re-enforcements, a third assault was made, the Americans after firing their last shot and fighting the British bayonets with clubbed muskets were obliged to retreat. The British pursued them only a short distance. The loss of the British was 1,054; that of the Americans being only 450, though among them was General Warren. In the center of the old fortification at Breed's Hill now stands a granite monument, 221 feet in height. The corner stone was laid by Lafayette in 1825, at the fiftieth anniversary of the battle, Daniel Webster delivering one of his greatest orations. It was completed in 1842 and dedicated in the following year, Webster once more being the orator of the day.

Bun'sen (*bo͞on'sen*), **Robert Wilhelm,** a distinguished German physicist and chemist, born at Göttingen, March 31, 1811. He received his university training at Göttingen, where he took his doctor's degree at the age of 20. His education was continued at Paris, Berlin and Vienna. At the age of 22 he began, with a privat-docentship at Göttingen, that marvelous career of teacher and investigator destined to extend over more than half a century and to make his name beloved by his own students and a household word for all others. The years from 1851 to 1899 were spent at the University of Heidelberg.

In addition to his more technical chemical investigations, the following may be mentioned as his most important contributions to science:

1. The invention of the Bunsen battery which replaced the expensive platinum plate of the Grove cell by a cheap carbon rod.
2. The invention of the Bunsen burner now in use everywhere from the kitchen to the research laboratory.
3. A satisfactory explanation of the phenomenon of the geyser, given after a trip to Iceland in 1847.
4. Precise methods for analyzing gases.
5. The chemical action of light.
6. His well-known ice-calorimeter for measuring quantities of heat.
7. His most important contribution, however, is that which he, in conjunction with Kirchoff, published in 1860 and 1861, namely, the establishment of the foundation of spectrum analysis. These two men showed that the prism is a reliable and delicate method for detecting the presence of any particular element in a chemical compound. And in their second paper they exemplified this fact by the discovery of two new elements, namely, *cæsium* and *rubidium.*

During the last ten years of his life Bunsen was not engaged in active teaching, but held an emeritus professorship at Heidelberg, where he died August 16, 1899.

Bunting, a group of birds between finches and starlings, containing numerous species widely distributed. Among these may be mentioned, as of special interest to our readers, the Snowflake, called Snow-Bunting; the Dickcissel or Black-Throated Bunting; Vesper Sparrow or Bay-Winged Bunting. And mention should be made of the Indigo Bunting, Painted, Varied, Beautiful and Lazuli Buntings. The Bunting is one of the few birds of the Arctics. See SNOWFLAKE AND DICKCISSEL.

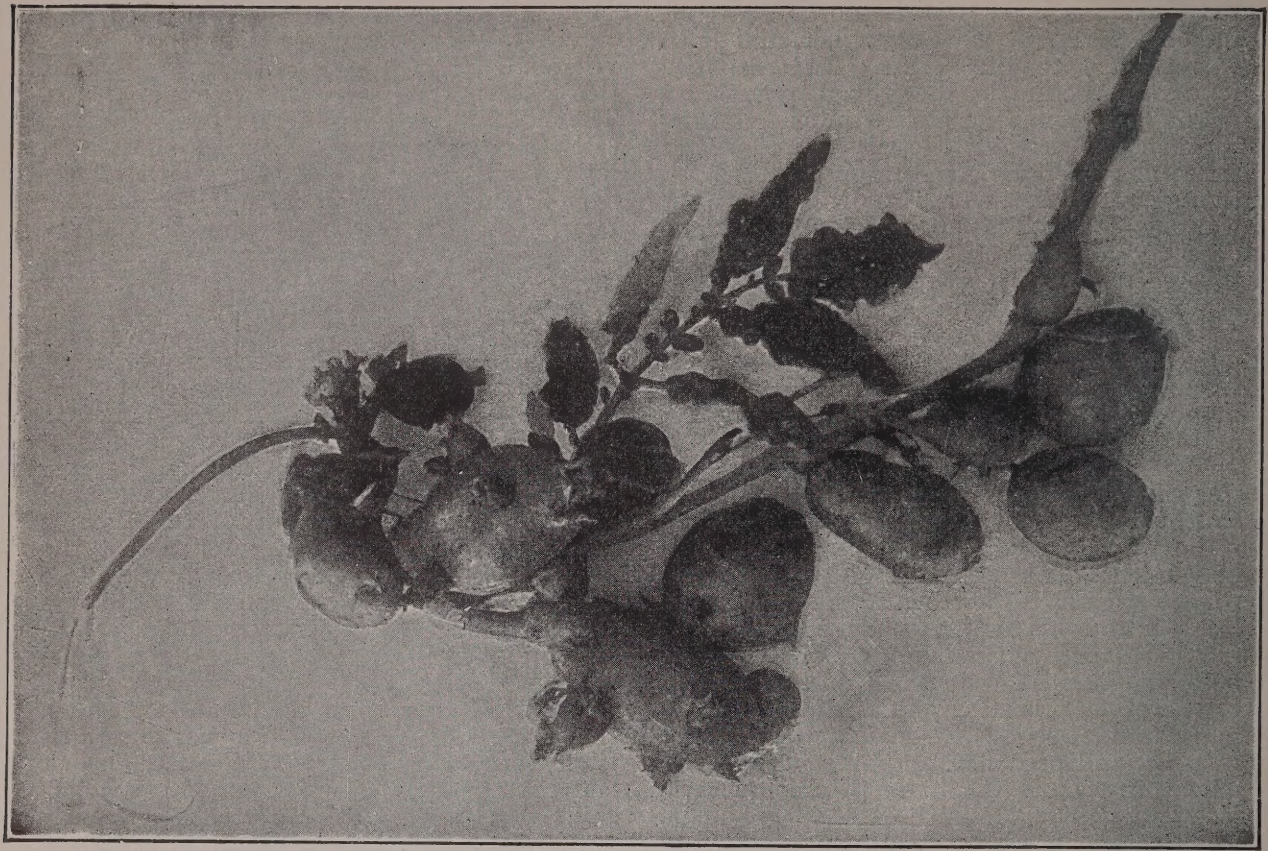
Bun'yan, John, author of *The Pilgrim's Progress,* was born near Bedford, England, in 1628. His father was a tinker, and John was trained to that craft. He was very fond of dancing on the village green and of ringing the church bells—things he afterward thought sinful. He served in the army for some time during the English Civil War, though only 16 years old. After the war he married a poor girl and became deeply interested in religion. He began to preach to the poor people in the villages around Bedford, and, getting into discussions with the Quakers, in 1656 he published a book against them. It was a remarkable book for an uneducated craftsman to write. This led to further discussion and the publication of other works, Bunyan being finally arrested and imprisoned. He was in prison 12 years, though he was continually told that he would be set free if he would give up preaching; to which he replied: "If you let me go to-day, I will preach again to-morrow." He supported himself and his family while in prison by making lace, the remainder of his time being spent in reading the Bible, preaching to the other prisoners and writing religious papers and books. He finally was released in 1672, and preached for three years, after which he was again put in prison, but was let out again six months later. While he was in prison the second time he wrote *The Pilgrim's Progress.* He became pastor of the Bedford Church, where he remained 16 years, dying in 1688. *The Pilgrim's Progress* at once became very famous and has since been translated into nearly a hundred languages.

Bur'bank, Luther, the "Plant Wizard," after four years of patient effort, developed the famous Burbank potato from small tubers of scanty yield when only a boy on the farm on which he was born near Lancaster, Massachusetts, in 1849. Although his achievement soon added $20,000,000 a year to the value of our potato crop, he sold his rights to a local seedsman for $150. Not long after, his health requiring outdoor life, he went to California, worked at odd jobs as a farm hand and finally saved enough to start a small nursery. When it was bringing him a profit of nearly $10,000 a year, he gave it up, against the protest of friends, and began the series of experiments on his farm at Santa Rosa which have given us not only the thornless, edible, fruit-bearing cactus, but a long list of other wonders of the plant world, including the crimson poppy, the Shasta daisy, a combination of plum and apricot called the plumcot, the white blackberry, new varieties of apples, pears and cherries, and a walnut tree that produces a wood like mahogany and of remarkably rapid growth. His thornless cactus is a forage plant showing great improvement in productiveness even over alfalfa. The fruit has a flavor between the raspberry and the pineapple, and will grow on the desert as well as the spiny variety. Thousands of acres have been planted, not only in this, but in almost every foreign country. Where alfalfa grows five to ten tons per acre, this cactus produces fifty to two hundred tons. The money derived by Mr. Burbank from the sale of improved varieties, considering the outlay required to produce them, has been small—from $100 to $500 each. The latter years of his life were given to producing improved varieties of trees, plants and flowers. He died April 11, 1926.

Burdett-Coutts, Lady. In 1814 there was born in Ramsburg, Wiltshire, England, a little girl named Angela, the daughter of Sir Thomas Burdett, a celebrated parliamentarian, and granddaughter of Thomas Coutts, a London banker. At the age of 22 she inherited a great fortune and became head of a banking firm that was second only to the Bank of England. People expected her to take a high place at the young queen's court and to marry a duke or prince. Instead she quietly set about the task of bringing light and hope to the swarming millions of East London. At a cost of $450,000 she built St. Stephen's Church, the first institutional church in the world. It combined the religious function with the social settlement. Other churches, schools, model tenements, scholarships in universities, evening schools, penny dinners for poor school children, a fishing school and fleet for famine-stricken west Ireland and a great market-house in the slums of East London, followed in rapid succession. Then plain Angela Burdett added her grandfather's name to her own and the Queen made her a baroness—the only woman of the people ever raised to the peerage in Great Britain. As Lady Burdett-Coutts, she secured the Children's Charter from Parliament, to protect children from cruelty; also a law to stop cruelty to animals. In a time of cholera she cleaned East London and forced new sanitary laws. She assisted starving Irish peasants to emigrate and carried on relief work in the Turko-Russian War. For 70 years she was the friend of the queen and of every celebrated man and woman of her time, from Charles Dickens to the Duke of Wellington. Walter Besant made her the heroine of his novel *All Sorts and Conditions of Men.* At the age of 68, she married her private secretary, Mr. Ashmead-Bartlett, who took her name and entered parliament to further her ideas of public good. She died in 1907 at the age of 93, universally mourned

Burgoyne (*bûr-goin'*), **John,** an English general during the American Revolution. His surrender to the Americans, Oct. 7, 1777, at Saratoga, (*q. v.*) was one of the most important victories of the war. Entering the army as a subordinate he had risen by distinguished service in Portugal before being sent to America. On returning to England he wrote an account of

SOME OF THE PLANT WIZARD'S WORK



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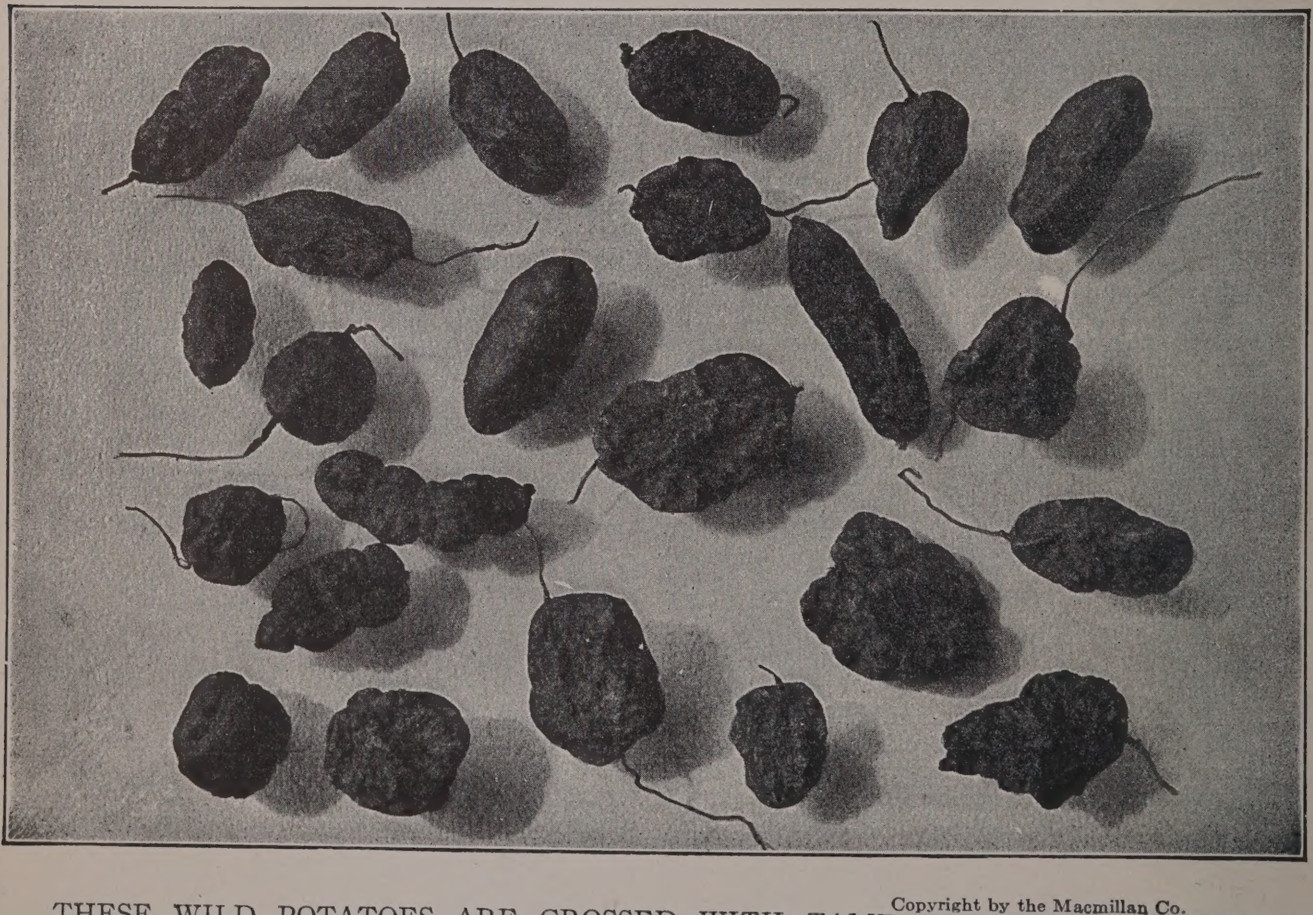
POTATO CAUSED TO GROW ON TOMATO VINE



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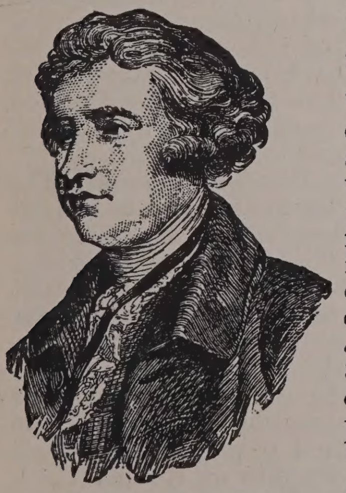
THESE WILD POTATOES ARE CROSSED WITH TAME POTATOES TO MAKE THEM HARDY his American campaign in his own defense, throwing the blame for his failure on the British cabinet. He also wrote several dramas. He died at London in 1792.

Bur'gundy (*bûr'gŭn-dĭ*), the name, at different times, of three kingdoms, of a duchy and lastly of a French province. The first kingdom was formed about 406, by the Burgundians, a German people who crossed the Rhine and extended their dominion over the Saône and the Rhone. They were converted to Christianity in eight days. About 100 years later they were conquered by the Franks, but the country still kept its name. About 300 years later, when the Carlovingian Empire was broken up, two kingdoms were formed from a part of old Burgundy, and called Lower Burgundy and Upper Burgundy, which afterward were united and finally fell under the power of Germany. The remaining portion of old Burgundy meanwhile had become a powerful duchy of France. In the first family of the dukes of Burgundy there was a succession of twelve, who were among the most powerful princes of their time and were noted for their loyalty to the French kings. This family came to an end, and soon after the duchy was given by the French King John, to his son, Philip the Bold. This duke and his three successors, John the Fearless, Philip the Good and Charles the Bold, are among the most famous historical characters of their age. The last two had royal power, and owned, besides Burgundy, the Netherlands and several other countries. After the death of Charles the Bold, the duchy of Burgundy became a province of France. This province included the present departments of Côte-d'Or, Saône-et-Loire and Yonne, with parts of adjoining departments. Burgundy wines, which are famous, are produced in these departments and named after the old province.



EDMUND BURKE

Burke, Edmund, a British statesman and author, was born at Dublin, Ireland, in 1729. He graduated at Dublin University, and proceeded to London to study law, but abandoned it for literary work. He wrote two works in 1756, the most famous of which is a study of the origin of our ideas of *The Sublime and the Beautiful.* Soon after he became acquainted with the celebrated Dr. Samuel Johnson, who said of him that "no man of sense could meet Mr. Burke by accident under a gateway, to avoid a shower, without being convinced that he was the first man in England." In 1765 he entered parliament, and at once became prominent because of his wide knowledge and learned speeches. In 1769 and 1770 he published two pamphlets which were widely read, called *The Present State of the Nation* and *Thoughts on the Cause of the Present Discontent.* He was a great student of American affairs, and his papers and speeches during the Revolutionary War made him unpopular with many people in England. At the same time he was greatly interested in English affairs in India, and led the trial of Warren Hastings for corrupt government in India. When the French Revolution broke out Burke at first favored it; but when he saw the leaders were becoming lawless and violent, he opposed it. His *Reflections on the French Revolution* was the most popular paper on the subject written in England; but it separated him from his former political friends, who were strongly in favor of the Revolutionary party. He wrote many other papers, but left Parliament in 1794. He died in 1797. Burke was one of the most famous orators England ever had, and his writings are wonderful examples of beautiful English.

Burlesques, a class of literary or dramatic compositions of the nature of parody or travesty, which date from classic times, and have had a considerable vogue in Italy whence the term (from the word *burla* which means raillery, mockery or jesting) is derived. Burlesques have also been much written in France, in England and in this country, the design of their authors being to travesty some well-known work, or to present a subject in a humorous or even a ludicrous aspect and treating it in a light, playful, jocose manner. Ancient examples can be traced back to the era of Aristophanes and to Hipponax of Ephesus (6th century B. C.), the latter being deemed the father of burlesque poetry. Its modern examples are those found in Italian literature, in the writing especially of Berni and Gozzi, whose most successful imitators were Sarrazin and Scarron in France, Chaucer, Beaumont and Fletcher, Butler in his *Hudibras,* the brothers Horace and James Smith in their *Rejected Addresses.* In dramatic burlesques the most notable example is Molière in France, and of the lighter order, Burnand, W. S. Gilbert and Plandie in England. The *Gil Blas* of Le Sage and *Don Quixote* of Cervantes are renowned examples of burlesque. In England many instances of burlesque and diverting poetic effusion are to be met with in the poems of Thomas Hood, Praed, Cocker, Calverley and Dobson. In this country plentiful examples will be found in the writings of Dr. O. W. Holmes and in our innumerable humorists and dialect writers.

Burlingame (*bûr'lĭn-gām*), **Anson,** an American statesman, born at New Berlin, New York, in 1820. He studied at the University of Michigan, and at the Harvard Law School, and began the practice of law in Boston. In 1853 he was elected to the senate of Massachusetts, and one year later to Congress, helping to form during the following year the new Republican party. In 1861 President Lincoln appointed him minister to China. In 1867 he intended to give up his position and return to America, but the regent of the Chinese Empire appointed him special Chinese ambassador to the United States and the countries of Europe, to make treaties between China and other nations. In July, 1868, he succeeded in getting new articles added to the old treaty between China and the United States, which gave the citizens of each country many privileges in the other, such as religious freedom and the right of founding schools. This is known as the Burlingame treaty. Mr. Burlingame then secured special treaties between most of the European powers and China, and was at St. Petersburg, negotiating a Chinese treaty with Russia, when he died in 1870.

Bur'lington, a city in Iowa, county seat of Des Moines County, on the west bank of the Mississippi. It is a beautiful and healthful city, the business portion being built along the river, while the residences are on high bluffs, from which there is a fine view up and down the river The city has good public schools, including a $250,000 high school and a Roman Catholic Academy. Notable in the city are the municipal buildings, opera house and public library. Coal is extensively mined near the city, making it a favorable place for industries, among which there are flour and planing mills, soap factories, Corliss engines and waterworks pumps, agricultural tools, furniture, etc. Population, 24,640.

Bur'lington (*bŭr'lĭng-ton*), **N. J.,** (formerly a port of entry) in the county of the same name, on the Delaware River, 19 miles northeast of Philadelphia and on the Pennsylvania Railroad Here are situated Burlington College, and St Mary's (P. E.) Hall for Girls, and the town has an opera house and a good public library, besides churches and schools. Its industries embrace iron pipe, stove and carriage works, harness and shoe-making establishments, also canned goods, besides berrying and market gardening. The city owns and operates its own water-works, its charter as a city dating from 1851, with revision in 1868. Population, 8,336.

Bur'lington, Vermont, a city and port of entry in Chittenden County, Vermont, on Lake Champlain. It is the seat of the University of Vermont and State Agricultural College, of the Vermont Episcopal Institute, (for boys) and of Bishop Hopkins Hall (for girls). The Mary Fletcher Carnegie Library Building. The city has Fletcher Free Library now housed in a Carnegie Library Building. The city has an extensive trade in lumber and in the manufactured products of lumber, in stone and marble and in proprietary medicines. Good water-power is furnished by the Winooski River and large cotton and woolen mills are situated here.

The public schools of the city have an enviable reputation, the parochial schools are largely attended, and there are two commercial colleges. Burlington is the educational center for a wide region of country. It is noted for its beauty of situation, for its wide and well kept streets, for its handsome private residences and for its fine public buildings. It has a municipal electric lighting plant. Population, 25,000.

Bur'ma, the largest of all the provinces of the Indian Empire, lies between Tibet, China, Siam and the Bay of Bengal. It covers about 236,738 square miles, considerably more than California and South Dakota, while the total population is over 12,115,000. The old province of Lower Burma occupies about one third of the territory, and the new province of Upper Burma, with the Shan States about two thirds.

Surface and Drainage. The country is mostly hilly, largely covered with forests. Of the numerous mountain peaks, the highest reaches an elevation of 15,000 feet. The largest river is the Irawadi, flowing from its unknown source in the snows of Tibet, over a course of 1,100 miles to the Bay of Bengal. It is navigable all the year round for river steamers for 700 miles; and though there are now several railroads, most of the trade is carried on by the numerous rivers.

Natural Resources. Teak and bamboo are the most valuable of the forest products. An unusual wealth of wild beasts, serpents, birds and fishes found in India abounds here. The mineral yield of the soil is not noteworthy, except that from the ruby mines near the capital. The ruby-yielding region extends for about 200 square miles, and the rubies are the best in the world.

People, Customs. Besides foreigners, the people are mainly Burmans, Shans, Karens and other hill tribes. The Burmans are the largest class. Their chief food is rice, and they have, besides, fish or meat daily. They live well, but save little money. Most of the people live in modern houses or bamboo huts, but the pagodas or temples of masonry and the monasteries made of teak are more substantial buildings. The finest and most sacred pagoda in Burma is the Shway Dagon Pagoda at Rangoon.

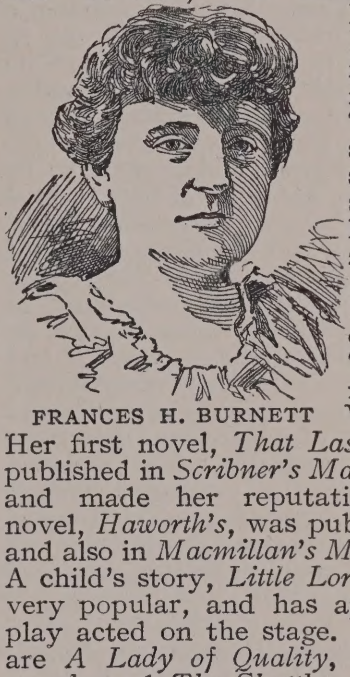
Products. The chief crop of the country is rice, the acreage of which in Upper and Lower Burma was, in 1904–05, 9,265,097 acres. Wheat, pulse, sugar-cane, cotton, tea and oil-seeds are also raised.

Religion. Their religion is chiefly Buddhism. The class which has the most influence and is most respected is the Buddhist monks, of whom there are 20,000, whose duty it is to set an example of a correct life and to instruct the young. The Shans are much like the Burmans, but are highlanders and great traders. The Karens used to be nature-worshippers; but now large numbers of them are Christians, through the influence of Baptist missions, which have been among the most successful of modern missions. Both the Burmans and the Shans have long had a written language, and there are now a number of native newspapers. A university and several technical schools are also established in Lower Burma.

History. The Burmans are believed to have come into the valley of the Irawadi about 2,000 years ago. Since that time various powerful Burman dynasties have risen, flourished and fallen. The Chinese have often invaded Burma from the north. The Burman power came into contact with the British in India as early as 1820, and, piece by piece, the British have been compelled to assume control over Burma. In 1885 King Thebaw declared war and tried to drive the British into the sea, but was overcome and carried a prisoner to India, and in 1886 the whole of Burma became a part of the British Indian Empire. It is governed by a commissioner on behalf of the viceroy of India. The capital of Upper Burma, Mandalay, has a population of 138,299; of Lower Burma the capital is Rangoon, population, 293,316.

Burne-Jones, Sir Edward C., a notable English painter, much admired in his day as a fine colorist, and clever also as an artistic stained-glass designer. Born at Birmingham in 1833 and educated at King Edward's School there, he entered Exeter College, Oxford, in his twentieth year, but shortly afterwards withdrew to study art under the influence of Dante G. Rossetti. Settling in London, he drew much from real life both in water-colors and in oil, his pictures possessing much brilliancy as well as purity of hue. He is classed among the Pre-Raphaelites, but himself free from the whilom extravagances of that school of art. In 1881 Burne-Jones received from Oxford the honorary degree of D.C.L., and in 1885 was elected President of the Royal Birmingham Society of Artists and made an Associate of the Royal Academy of Arts, London. The latter he resigned in 1893 when he became one of the founders of the New Gallery, where and at the Grosvenor Gallery, in the British metropolis, most of his pictures were first exhibited. In 1894 the artist was made a baronet, elected an honorary Fellow of Exeter College, Oxford, and was decorated with the French Legion of Honor. At an early period in his career he came under the influence of Ruskin; while, besides his varied and magnificent work as a painter, he did much as a designer of mosaics for church windows, at Oxford and elsewhere in England, as well as for the apse of the American Church at Rome. Among his best known oil paintings are *King Cophetua and the Beggar Maid*, *The Resurrection*, *The Annunciation*, *The Golden Stair*, *Merlin and Vivien*, *Pygmalion and the Image.* His principal water-colors include *The Days of Creation*, *The Wine of Circe* and the series known as *Spring*, *Summer*, *Autumn*, *Winter*, *Day* and *Night.* Sir Edward Burne-Jones died in London in 1898.

Burnett', Frances Hodgson, an American novelist, was born at Manchester, England, in 1849. In 1865 her family came to America and settled in Tennessee, where she began writing stories. Her first story was published in a magazine in 1867. In 1873 she married Dr L. M. Burnett, of Knoxville, Tenn. They removed later to Washington, D. C. Her first novel, *That Lass o' Lowries*, was published in *Scribner's Magazine* in 1876–77, and made her reputation. Her second novel, *Haworth's*, was published in *Scribner* and also in *Macmillan's Magazine* (London). A child's story, *Little Lord Fauntleroy*, was very popular, and has appeared also as a play acted on the stage. Her later stories are *A Lady of Quality*, *His Grace of Ormonde* and *The Shuttle.*

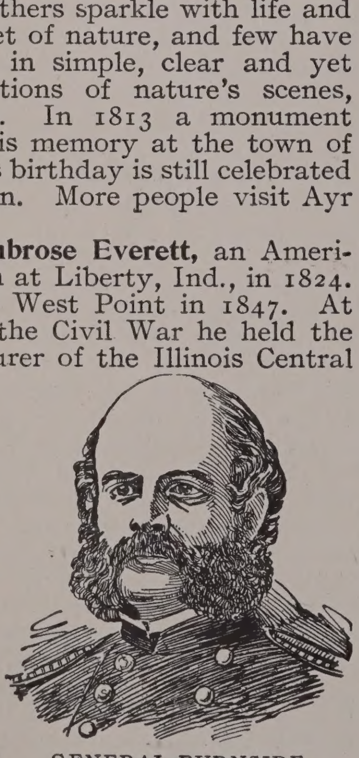

FRANCES H. BURNETT

Burnham, Sherburne Wesley, a notable astronomer, now professor of practical astronomy, in the University of Chicago, was born at Thetford, Vt., in 1838. While clerk of the United States circuit court in Chicago, he early devoted himself to the study of the heavens and made many discoveries, especially of double stars, which he described with a 6-inch refractor. In 1876 his devotion to astronomy led to his connection first with Chicago Observatory and for a time with the Lick Observatory in California. For his discovery, measurement and cataloguing of double stars, he was awarded the gold medal and made a Fellow of the Royal Astronomical Society of England.

Burns, Robert, a Scottish poet of great genius was born near the town of Ayr in

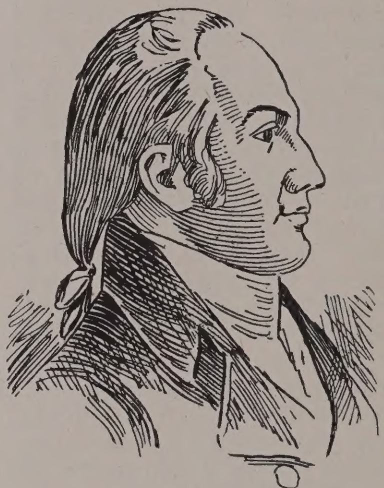
1759. His father was a poor farmer and Robert was brought up on the farm, gaining most of his education between his hours of work. The Bible and a few collections of poems were the books he read. His beautiful poem, *The Cottar's Saturday Night*, is a picture of his simple home in those early days. When he was 15 years old, he wrote his first poem, led to it by his love for a little girl who worked with him in the hayfield. Through all his life Burns had a great love for women, and many of his most beautiful pieces are love-poems. At 18 he went to school for a short time, and at this period wrote several short poems. A few years later, he and his brother took a farm, in order to support their parents, but he still kept writing bits of poetry, which were far more successful than his farming. Finding that he was not succeeding on the farm, he decided to go to Jamaica, and published a volume of poems to pay his way. This volume at once made him famous, and instead of setting out to Jamaica, he went to Edinburgh, where he remained a year and made many valuable acquaintances. He rented a farm, and was soon after given a small government office, with a salary of $350. Unfortunately, he was of intemperate habits, and had to give up his farm. He, however, kept on writing, but his love of drink and the disappointment of his hopes of success injured his health, and he died in his thirty-seventh year, in 1796. His poems are the most musical in the language. His humor is great; and many of his poems are very simple and touching, while others sparkle with life and wit. He is a poet of nature, and few have approached him in simple, clear and yet touching descriptions of nature's scenes, objects and life. In 1813 a monument was erected to his memory at the town of Dumfries, and his birthday is still celebrated among Scotchmen. More people visit Ayr than Stratford.

Burn'side, Ambrose Everett, an American general, born at Liberty, Ind., in 1824. He graduated at West Point in 1847. At the outbreak of the Civil War he held the position of treasurer of the Illinois Central Railroad. In 1861 he was appointed colonel of the First Regiment of Rhode Island volunteers, and commanded a brigade at the battle of Bull Run. After taking part in various engagements, he succeeded General McClellan as commander of the Army of the Potomac. General Lee took possession of the heights of Fredericksburg, and in a vain attempt to drive him from his position Burnside was defeated with great loss. His resignation of the command was accepted, and he was given the generalship of the department of the Ohio. He drove the Confederates out of East Tennessee, for which he received the thanks of Congress. He was later besieged in Knoxville, until the siege was raised by the approach of Sherman with a part of Grant's army. He was then transferred to the Army of the Potomac, and took part in its closing campaigns. He resigned in 1865, and the next year was chosen governor of Rhode Island, and reelected in the two following years. He was elected United States senator from Rhode Island in 1875 and again in 1880. He died at Bristol, R. I., September 13, 1881.



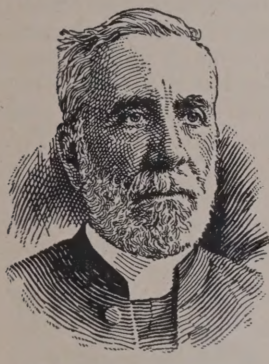
GENERAL BURNSIDE

Burr, Aaron, third vice-president of the United States, was born at Newark. N. J., in 1756. He graduated at Princeton College, and entered the army, where he won distinction and attracted the favorable notice of Washington. Soon after, however, for some unknown reason he incurred Washington's dislike. After the Revolutionary War, he practiced law at Albany, and married the widow of a British officer. He was appointed attorney-general of New York, and in 1791 was returned to the United States senate. In 1800 he was elected vice-president of the United States by the Democratic party. Four years later he was the Federalist candidate for governor of New York; but many of the leading men of the party refused to support him, and he was defeated. This led to his duel with Alexander Hamilton, in which Hamilton was killed. Burr was tried for murder, and, though acquitted, never regained his place in popular opinion. The next year Burr set out on a journey to the southwest. He was suspected of plotting to found a new empire out of Mexico and a part of the present southern states, and was arrested and tried at Richmond, Va., but was acquitted He went to Europe in the following year, but returned in 1812, and began again the practice of law in New York. He died neglected in 1836, his only child, Theodosia, having been lost at sea. His success was largely due to his attractive and polished manners



AARON BURR

Burroughs (*bŭr′rōz*), **John,** American naturalist, essayist and man-of-letters, was born at Roxbury, N. Y., April 3, 1837, and received an academic education. For a time he taught school, was a treasury clerk at Washington, D. C., and afterwards examiner of national banks. After 1874 he lived on a farm, devoting himself to literary work and to fruit-culture and the observation of nature, of which he was an ardent lover and keen and kindly observer. His studies of birds and of field-life have been close and intimate; and his books on these and other themes make delightful reading. Among his publications are *Wake-Robin; Signs and Seasons; Pepacton; Riverby; Birds and Poets; Winter Sunshine; Locusts and Wild Honey; Fresh Fields; Indoor Studies;* and a monograph on *Walt Whitman.* His death occurred in 1921.



CHANCELLOR BURWASH

Burwash, Rev'd Nathaniel, born at St. Andrews, Quebec in 1839. A graduate of Victoria University, ordained 1864. Later studied at Yale. In 1867 appointed professor of natural history and geology at Victoria University. In 1887 he became president of the University. A member of each general conference of the Methodist Church from 1874 to 1894. In 1889 president of the conference, contributed largely to bringing about the federation of the universities which was effected in 1885. The author of a treatise on *Wesley's Doctrinal Standards.* Has been most influential in every branch of educational reform in the province (Ontario). A leader of Methodism for a whole generation.

Business College. The business or commercial college is, properly speaking, a trade school for the purpose of teaching those desirous of securing an elementary position in business, such as that of clerk or bookkeeper, the things of immediate use to them for that work. It is a private institution usually, without endowment or government inspection.

Conditions of admission are very lenient, and pupils may enter at any time. As pupils differ widely in age, preliminary training, etc., much of the instruction is given individually rather than in classes. The length of the course varies from three months up to 15 months or more, and tuition fees range from five dollars per month up to about twenty dollars. Evening classes have been largely taken advantage of by those who were obliged to pursue their usual occupation during the day.

Owing to the introduction of commercial courses into the public schools and to competition among themselves, the business college has developed from the type of 50 years ago with one or two teachers giving elementary instruction in arithmetic, keeping of accounts and ornamental penmanship, to the thoroughly equipped business college of to-day, with trained teachers offering first-class courses in a wide range of subjects, such as stenography, typewriting, commercial law and geography, history of commerce, business practice and office methods, advanced bookkeeping, etc. Present tendencies are towards longer courses, with more instruction both in the broader general studies, such as English composition, and in the more specialized technical lines.

The business college has been of immense value in giving to thousands of persons in a short time the necessary equipment for a business position, and in securing suitable situations for them.

Butcher-Bird. See SHRIKE.

But′ler, Benjamin Franklin, American lawyer, soldier and statesman, was born at Deerfield, N. H., November 5, 1818. He entered on the practice of law in Lowell, Mass., in 1840, where he gained a high reputation. He served in the state legislature, both in the house and in the senate (1853–59). He served as major-general in the Civil War; was in command at Fortress Monroe in 1861; at New Orleans in 1862; and of the department of Virginia and North Carolina in 1863. He was returned to Congress by the Republicans in 1866, where he served until 1879, except the term of 1875–77. In 1882 he was elected governor of Massachusetts by the Democrats. In 1884 he was an unsuccessful candidate for the presidency in the Greenback interest. He died at Washington, D. C., January 11, 1893.

But′ler, Nicholas Murray, Ph.D., LL. D. Born in Elizabeth, N. J., April 2, 1862; graduated from Columbia College in 1882; and studied in the Universities of Berlin and Paris. In 1885 Dr. Butler became an instructor in Columbia College, and since that time he has been associated continuously with Columbia College and University. He was president of Teachers' College from 1886 to 1891, and in 1902 became president of Columbia University. Dr. Butler has been connected with the administration of numerous important boards and associations, and has received several honorary degrees from both American and foreign universities He is the editor of *The Educational Review,* the author of *The Meaning of Education,* and has made other valuable contributions to the literature of education.

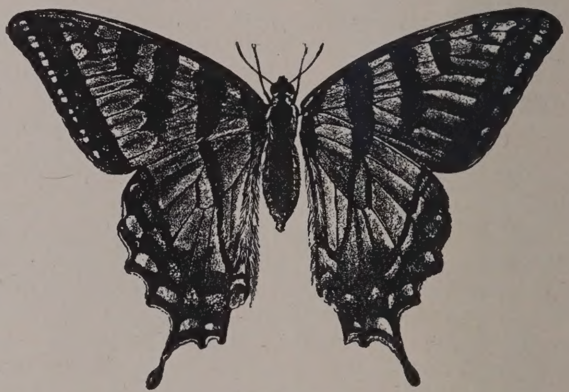
But′ler, Pa., the chief town of Butler County, western Pennsylvania, 33 miles north of Pittsburg. It has a number of flour and silk mills, glass and oil well supply factories, whose motive power is derived from natural gas. Butler's largest industry is a steel-car works employing 5,000 men; it also has a large oil-refinery and bedstead factory. Four lines of railroads pass through it. Population, 26,000.

Butte, Mont. The streets of this city, end to end, would reach only 275 miles, but the underground mining channels of its 150 producing mines would reach 2,700 miles, one mine being 3,633 feet deep! Butte is literally "a city set upon a hill," and derives its name from Big Butte, a high mountain in southwestern Montana near the city. First settled by two travel-stained miners in 1864, it is to-day the largest city in the state. In the vicinity of Butte, inside a 1000-acre tract, nature stored so much gold and silver that thousands of people flocked there, and so much copper that since the discovery one-sixth of the world's supply has come from that city. Mineral wealth produced has been over two billion dollars. The annual mineral output would fill a train 29 miles long. Its 50,000 inhabitants live 5,500 feet above sea level, and smile when good market years pay them $100,000,000 yearly for the minerals mined. Zinc and lead are also mined. The air is clear, the stars seem more than bright, but the winters are very cold.

Butter, the fatty part of milk, obtained from milk or cream by churning. Milk is made up of three parts, the cheesy portion or curd, the whey or watery part which contains milk-sugar, and the butter; and when examined by the microscope is seen to consist of a number of little globules of fat floating in a clear liquid. These globules collect and form cream after the milk has stood a few hours, and the process of butter making or churning is simply to cause the particles of fat to come together in a mass. After churning, the butter is washed and salt added to prevent the forming of certain acids which give old butter its rancid taste. Besides the common method of churning, butter is made in parts of South America, by jolting the cream, which is put in gourds or skin bags, on the backs of donkeys, or, as in Buenos Ayres, by dragging it in a skin-bag behind a galloping horseman. Indeed, butter is said to have been discovered by carrying milk in skin bottles on camels, in which the butter was made by the jolting. It takes about two quarts of cream to make one pound of butter. Artificial butter, called oleomargarine, is now made from beef-fat.

Buttercup, a well-known wild-flower, member of the Crowfoot family. It was brought to this country from Europe and is generally distributed throughout Canada and the United States. In the north, Buttercups are especially abundant and handsome. Their season of blooming is from May to September, localities preferred by them meadows, fields, roadsides and grassy places. English children call Buttercups, King-Cups or Gold-Cups. Shakespeare speaks of them as "cuckoo-buds of yellow hue," and says they "do paint the meadows with delight." There are many kinds, but the first comer is the Bulbous Buttercup, blooming early in May, lasting till the end of June; a small, erect plant of meadow and roadside, the blossoms golden-yellow, leaves bright green. The Meadow Buttercup grows in field and by roadside, sometimes rises as high as three feet, and blooms from May to August, occasionally until frost, the flower, pale yellow. The Swamp or Marsh Buttercup, dots with gold low meadow lands, blooming from April to July, its blossoms huge and satiny. Children are warned not to bite Buttercup stem and leaf, as a blister might result.

Butterfly, the common name for a group of day-flying insects. Butterflies and moths form a natural order of the class *Insecta*, and are so closely related that they should be considered together. Nearly every boy knows that a sort of dust sticks to the fingers after handling butterflies and moths. This dust, examined under the microscope is seen to be made up of minute scales, with which the wings of these insects are covered, and this circumstance gives them the name of the scaly-winged (*Lepidoptera*). It is a common mistake to suppose that the moths are all plain and somber in color, while butterflies are more brilliant. The group of moths, on the contrary, embraces some of the largest and most beautiful members of the order. The butterflies are day fliers, their antennæ are knobbed at the end, and they fold their wings vertically over the back when at rest. The moths fly mainly at night; their antennæ are of various forms; and their wings are seldom elevated in repose.



BUTTERFLY

Butterflies and moths make an attractive cabinet. A collection can be started with very little trouble. The requirements are: a net spread over a hoop attached to a cane or pole; a killing fluid, as chloroform or benzine; a board for spreading the wings until they are dried, and a tight covered box in which the specimens may be kept. Hodge in *Nature Study and Life*, recommends a home-made glass case, specimens glued. As is well known, butterflies and moths come from caterpillars and various other larvæ forms. The eggs are laid by the full-grown insects, but from them hatch worm-like larvæ instead of winged insects. After feeding and moulting, the larvæ in turn form cocoons or cases about themselves, from which they emerge as butterflies and moths. The larvæ are exceedingly varied; the common, woolly caterpillars, the measuring worms, forming a group of moths; the tomato worm, the milkweed worm are familiar examples. From the cabbage worm come the white butterflies that are so common. Some are destructive to crops, as the army-worm; some to fur and woolen fabrics, as the small, inconspicuous larvæ of the woolen moth; and some to trees, as the gypsy moth. (See CATERPILLAR.)

Among the butterflies of the United States the swallow-tailed variety (see Fig.) is the largest and most attractive. The common yellow and white varieties are the most numerous. The brownish milkweed butterflies are very well known. The *promethea*, *polyphemus* and *luna* moths are large and beautiful, as are also the moths of the silkworm. Some of the common, dark-colored butterflies (*euvanessa antiopa*) live through the winter in sheltered places in the middle and northern states and come out on warm days. Some of the large tropical butterflies are exceedingly brilliant in color, and measure upward of eight inches in spread of wings. The mouth parts of butterflies and moths are much changed. There are no biting jaws, but a long, sucking tube, coiled like a watch-spring when not in use, sucking nectar and honey from flowers. Some of the forms resemble leaves when the wings are folded over the back, and are protected from their enemies by this resemblance. See Scudder: *Everyday Butterflies* (1899); French: *Butterflies and Moths of the E. U.S.* (1896); Holland: *The Butterfly Books*, with colored plates but of moderate price; the beautiful and extensive monographs of Edwards and Scudder; Weed: *Life-History of American Insects;* Comstock: *Insect-Life;* and Crojin: *Our Insect Friends and Foes.*

Butternut or white walnut, is an American tree, growing to a height of 20 to 50 feet. It has numerous spreading branches and a smooth, ash-colored bark. It blossoms in May, and the fruit ripens in September and October. The fruit is an oblong nut, covered with a thin husk or hull, dark-brown when ripe. The kernel is sweet but oily. The bark and shells yield a dark-brown dye, and a poor quality of sugar can be obtained from the sap. The half-grown fruit is also used for pickles. The timber is valuable, and is much used for cabinet-making, gun-stocks, etc.

Butterworth, Hezekiah (1839–1905), a well-known writer of juvenile books, and a poet of fair ability, was a native of Warren, R. I. Mr. Butterworth was a platform lecturer of repute, speaking at times upon education, at times on hymnology, but for the most part upon his travels, which included tours in Europe, South America Cuba and Canada. Among the works of Butterworth, most of them books for boys, may be mentioned several volumes of *Zig-Zag Journeys*, the *Knight of Liberty*, *In the Boyhood of Lincoln*, *Great Composers*, *The Patriot Schoolmaster*, *Songs of History*, *Poems and Ballads* and *Boys of Greenway Court*, together with several cantatas.

Buttons, useful articles of wear, used as coat and dress fasteners or as mere ornaments, and made of bone, wood, metal, jet, papier maché, mother of pearl or glass. They are manufactured in various sizes, and sometimes covered with cloth or other material, and also made with and without shanks. Birmingham, England, is a great seat of their manufacture; while they are extensively turned out in factories in this country, in the different varieties of the button industry, there being to-day about 250 button-making factories in the United States, with a gross value-output of close up on $8,000,000. The process of manufacturing them is chiefly by stamping in the case of metal buttons; while the cast button is made in molds by pouring molten metal over them, the loop of wire which forms the shank being suspended in the process and pressed into the bottom of the button. Powdered steatite, saturated with soluble glass, is used for making shirt buttons in molds, the buttons being afterwards baked and polished. Other kinds of buttons are made of various composites, as well as of vegetable ivory and of the hoofs of cattle, boiled down and turned out in hydraulic presses of the various sizes and patterns.

Buzzard. The term is used in a loose way. The true buzzards include the hen-hawks and the common buzzard of Europe. The hen-hawks, embracing the red-tailed and rough-legged buzzards, are good representatives of the group as to general appearance and average size. The white-tailed buzzard of South America and the common fish-hawk or osprey are other varieties. The true buzzards are related to the eagles and falcons. The so-called turkey-buzzard belongs with the vultures, and not with the buzzards. In the south this bird is protected by law, both whites and negroes appreciating its services in removing decaying matter. Seen floating high up in the air, one forgets its habits and thinks only of the beauty of its motion;

it is very familiar to the children of the south.

Byng, Julian Hedworth George, Baron, First Viscount Byng of Vimy, of Thorpe-le-Soken, Essex, a distinguished British general, was born on September 11, 1862, the seventh son of the second Earl of Strafford. He rose in the army from the rank of Lieutenant in the Tenth Royal Hussars in 1883 to General. He served in the Sudan in 1884 and in South Africa from 1899 to 1902. In the World War he served at the Dardanelles in 1915 and in France was commander of a cavalry division and a cavalry corps before leading the Canadian Expeditionary Force.

He was one of the most distinguished British officers during the World War. His great feat was the capture of the crest of Vimy Ridge. In May, 1916, he was made commander of the Canadian Expeditionary Force. From 1917 to 1919 he was commander of the Third British Army, with the rank of General.

At the conclusion of the World War he was given the thanks of Parliament and 30,000 pounds sterling. By Letters Patent of October 7, 1919, he was created Baron Byng of Vimy and Thorpe-le-Soken, County Essex. He was sworn in as Governor-General of Canada at Quebec on August 11, 1921.

Lord Byng was made Grand Officer of the *Legion d'Honneur*. He was awarded the Croix de Guerre of France and several other orders. On April 30, 1902, he married Marie Evelyn, only child of the Honorable Sir Richard Charles Moreton, K.C.V.O.

Her Excellency, the Lady Byng of Vimy, Marie Evelyn Byng, besides being the first lady of Canada, has distinguished herself in the field of letters, for she is the author of two novels, *Barriers,* published in 1912, and *Anne of the Marshlands,* published in 1913.

Byrd, Rear Admiral Richard Evelyn, famous explorer and aviator, was born in Winchester, Virginia, on October 25, 1888, the son of Richard Evelyn Byrd and Elinor Bolling (Flood) Byrd. The Byrd family, of which he is a distinguished descendant, has been prominent in Virginia since early Colonial days. At an early age the lad manifested an adventurous yearning. When but fourteen years old, young "Dick" travelled around the world alone. He stayed a year in the Philippines. Upon his return from that journey, he continued his education at Shenandoah Valley Military Academy, Virginia Military Institute, University of Virginia and the United States Naval Academy, from which he was graduated in 1912. He entered the Navy as an ensign, and attained the rank of lieutenant-commander.

On January 20, 1915, he was married to Marie D. Ames, of Boston, Massachusetts, for whom "Marie Byrd Land" in the Antarctic was later named. They established a residence in Winchester, Virginia, which remains the family home to-day, and where their son and three daughters were born. Lieutenant-commander Byrd was retired from the navy in 1916, because of physical disability due to an injury to one of his feet. He remained in active service, however, for a number of years.

In August, 1917, he entered aviation, and during the participation of the United States in the World War, was in charge of the United States naval air forces in Canadian waters. He built up the naval stations at North Sydney and Halifax, Nova Scotia. He was in charge of the navigational preparations for the first successful flight of the Navy Expedition in 1919. In 1925 he was in charge of the Navy Unit of the Macmillan Arctic expedition, which crystallized his desire to fly over the North Pole.

On April 6, 1926, financed by a group of men including Edsel Ford, John D. Rockefeller Jr., and Vincent Astor, he sailed on the steamer *Chantier,* arriving at King's Bay, Spitzbergen, on April 29. On May 9, with his pilot, Floyd Bennett, he made the first flight over the North Pole, covering 1,360 miles in fifteen and one-half hours, and circling the Pole, dropped the American flag over it. He used the *Josephine Ford,* a tri-motored Fokker. His observations on this flight confirmed the reports of Peary, and proved that there is no land around the North Pole. After this flight, the Navy promoted him to the rank of commander.

On June 29-30, 1927, he flew a Fokker trimotor plane from New York to France, accompanied by three other aeronauts. In 1928-30 he accomplished his famous expedition to the Antarctic. Three ships, two sailing from New York and one from California, met at Dunedin, bringing together the forty-two men and the stores of the expedition. The equipment was more complete than on any previous polar expedition, including radio-equipped airplanes, and every scientific device that might be of positive value. A special short wave sending and receiving set was built according to the combined ideas of the best experts in that field, for the particular needs of the expedition. Two large tractors were taken to aid the Eskimos and dogs in transportation, and for lifting the heavy supplies off the ships.

The village of "Little America" was built, and from it on November 29, 1929, Byrd made a successful flight over the South Pole, in the tri-motored Ford plane, the *Floyd Bennett.* The Pole was crossed at approximately 1:14 p.m., Greenwich civil time. Sixteen hundred miles were covered in nine hours. Automatic cameras that pointed downward made possible the first visible record of polar exploration, and a photographic panorama of the land covered by the flight was secured. The photographer took overlapping pictures of the Liv Glacier, the high Polar Plateau, the south Pole itself, and the miles of snow, crevasses, and long broken glaciers down to the foot of the mountains. The first photographs included the newly discovered Rockefeller Mountains.

Development of these pictures was exceedingly difficult. A photographic laboratory was actually sunk in a fifteen foot hole deep in the snow. The hardest task was the melting of snow and ice to make the two hundred gallons of water necessary for the development of each roll of film, but in spite of all the difficulties the pictures were all clear. From them, rough maps of the region were made, and after the return of the expedition, accurate maps were drawn with great precision. One of Byrd's ships, *The City of New York,* was exhibited at A Century of Progress, 1933 and 1934.

In the spring of 1934, Rear Admiral Byrd took his second expedition to the South Pole. "Little America" was found in remarkably good condition, restored, and the supplies moved to it and the various supply depots. During the winter season that followed, the men remained at "Little America," but Byrd erected a shack on the Ross ice barrier. There he established himself alone, with scientific instruments to observe meteorological conditions in what it was thought would probably prove to be the coldest spot in the world.

From this advanced weather base, he announced by radio his plans for geographical exploration and scientific research during the spring and summer polar season. The two most striking projects he desired to attempt were a long flight in an eastern direction over the peaks of the Edsel Ford range and across the untravelled plateau behind it; and exploration of the plateau itself for geophysical and cosmic ray research. The flight was planned to include photography from the air. The research party was intended to advance to the plateau by means of dog team and tractor. Byrd also planned to send another group of men eastward with dog teams to travel along the majestic front of the Edsel Ford range and map and explore its principal features. In addition, a party of geological experts were to travel southward, cross the Ross ice barrier, and explore along the foot of Queen Maude range, which is 425 miles south of Little America. Rear Admiral Byrd kept in constant touch with his men by radio from his isolated shack. By radio, on the Fourth of July, 1934, he rang the famous old Liberty Bell in Philadelphia.

Among the interesting meteorological observations by the expedition was the announcement by Dr. Thomas C. Poulter, senior scientist, that at least a billion meteors a day strike the earth's atmosphere and disintegrate in flashes of fire. Low temperatures and the clear air in the winter darkness of "Little America" make ideal conditions for observations which led to this calculation. High above the earth's surface, Dr. Poulter says, are winds of tremendous velocity, as proved by the trailing meteors he has seen, which remained lighted long enough to give a clue as to wind velocity and direction.

Byrd has won a deserved reputation as an aviator and scientist. On June 23, 1926, President Coolidge presented him with the Hubbard Gold Medal for "valor in exploration." He also was awarded the Congressional Medal of Honor, the Distinguished Service Medal, the Flying Cross, and he was made an officer of the *Legion d'Honneur.* He has received twenty-two citations from the Navy Department for exceptional services. He is the author of *Skyward,* an autobiography published in 1928, and *Little America,* the story of the 1928-30 expedition. He has also published official reports of the various expeditions in which he took part, and contributed a number of scientific articles to periodicals.

See AERONAUTICS; POLAR EXPLORATION.

Byron, George Noel Gordon, Lord, a great English poet, was born at London in 1788. His father died when he was three years old, and he was brought up by his mother, a woman of weak mind. He attended Cambridge University in 1805. Two years later, he published his first volume of poems, which at once brought him fame. In 1808 a criticism of his poems appeared in the *Edinburgh Review.* He replied to it in a satire called *English Bards and Scotch Reviewers,* which at once showed his power as a writer. During this time he was living at Cambridge and in London, and spending his time in a frivolous and immoral high-class society. Becoming tired of this mode of living, and thinking that his genius was not appreciated, he left England and travelled in Spain and Greece. During his travels he wrote the first part of his greatest work, *Childe Harold's Pilgrimage.* While in Greece he performed the famous feat of swimming across the Hellespont, in imitation of the Greek story of Hero and Leander. On his return to England he was received with great favor. His *Giaour, Corsair* and *Lara* were written soon after. He married, but was afterward separated from his wife, and, owing to public disfavor, he left England never to return. He stayed in Geneva for a time, where he wrote his *Prisoner of Chillon.* Later on he lived in Venice, where he finished *Childe Harold,* and began *Don Juan,* one of his notable works. In 1822 he sent money to the Greeks, who were fighting for independence from the Turks; and soon after went to Missolonghi to join the Greek forces, but died there of a fever, in 1824. He is now considered one of the greatest of English poets. His power of description has rarely been equalled.

See LITERATURE.

Byzan'tine (*bĭ-zăn tĭn*) **Empire,** also called the EAST ROMAN, EASTERN, GREEK or LOWER EMPIRE, was founded in 395 A.D., when Theodosius the Great divided the Roman Empire between his two sons, Honorius and Arcadius. Arcadius was made emperor of the eastern division: Syria, Asia Minor and Pontus in Asia; Egypt in Africa; and Thrace, Mœsia (now Bulgaria), Macedonia, Greece and Crete in Europe. The empire thus formed lasted for more than a thousand years, and underwent a great variety of fortune. It took the name Byzantine from Byzantium, the old name of its capital, which, after 330 A. D., was usually called Constantinople or New Rome.

The period of Greek revival (395-716), as it is called, is marked by the victories of Justinian and Heraclius. Justinian (527-565) is celebrated for his code of laws and the victories of his great generals, Belisarius and Narses. Maurice (582-602), by his weak rule, brought the country to a condition of lawlessness from which it was rescued by Heraclius, who overthrew him, and reigned from 610 to 641. Great as his genius was, he suffered twelve years of defeat before he could organize a victorious army. In 622 he began those splendid campaigns in which Persia was crushed, and which, Gibbon says, were equal to those of Scipio or Hannibal.

The period of prosperity lasted from 716-1057, and was marked by successful defense against Saracens and Bulgarians. Leo III, Constantine V, Leo IV, Basilius I and Nicephorus Phocas all won victories over the Saracens and Bulgarians. The dynasty founded by Basilius held the throne most of the time from 867 to 1056. John Zimices (969-976) won victories over Saracens, Bulgarians and Russians, while Basilius II (976-1025) conquered the Bulgarian kingdom. At the beginning of the 11th century the Saracen power, which had so long been dangerous to the empire, broke up, but the Seljuk Turks, a yet more formidable enemy, appeared on the eastern frontier.

The period of the decline (1057-1204) was marked by the crusades and the advance of the Turkish power. With Isaac Comnenus (1057-1059) the Comnenian dynasty began. In the reign of Alexius Comnenus (1081-1118) began the crusades, in which the Byzantine emperors had a hard part to play. The crusades, however, helped greatly to check the advance of the Turks, whose power already reached to the Hellespont. The last Comnenian prince, Andronicus, was killed in a rising excited by his own cruelty, in 1185, and left the country in a state of utter confusion.

The period of Latin occupation lasted from 1204 to 1261. In 1204 the French and Venetians, together called Latins, marched on Constantinople and captured it. The European part of the empire was carved into four divisions; the first part, including Constantinople, fell to the lot of Baldwin, the Count of Flanders. In Asia, Theodorus Lascaris set up a government at Nicæa, and Alexius Comnenus ruled at Trebizond. The Latin occupation was harmful to the empire, which never regained its lost unity. Michael (VIII) Palæologus, one of the rulers of Nicæa, captured Constantinople in 1261 with the aid of the Genoese, and so put an end to the Latin dynasty.

The period of the fall (1261-1453) was marked by the quick oncoming of the Turks. They took Nicæa in 1339, and first made a settlement in Europe by capturing Gallipoli in 1354. Adrianople fell in 1361, and became the Ottoman capital. By 1381 all that was left of the Byzantine empire became tributary to the Turks. The sultan, Bajazet, by defeating the Hungarians in 1396 forced Manuel II to cede to him a street in Constantinople. The whole city would soon have fallen had not Timur, the Tartar conqueror, defeated Bajazet at Angora in 1402. At last the capital fell before Mohammed II, May 29, 1453.

On the throne of this great empire, to which modern Europe owes its moral and intellectual development and which maintained a struggle with darkness for 1,000 years, sat seventy-six emperors and five empresses. Of these, fifteen were put to death; seven were blinded or otherwise mutilated; four were deposed or imprisoned in monasteries; and ten were compelled to abdicate. In the fourth century she fought the Goths; in the fifth the Huns and Vandals; in the sixth the Slavs; in the seventh the Persians and Arabs; in the eighth, ninth and tenth the Bulgars, Magyars and Russians; in the eleventh the Seljukian Turks; the Ottomans, Normans, Venetians, Crusaders and the Genoese. "No wonder she at last fell exhausted."

Reviewing its entire annals, the history of the fall of the empire may be said to be the record of a noble struggle in the face of overwhelming odds. For many centuries it was the bulwark of Christian culture.

Byzantine art and literature became famous the world over. When Constantine the Great rebuilt Byzantium as Constantinople, he adorned two large tracts in the center of the city with statues and colonnades. The hippodrome was enriched by the celebrated Delphian serpent-column, and the whole empire was robbed of its finest art treasures for the capital. A magnificent group of buildings was erected as the palace of the Emperor. Byzantine architecture and art were disseminated from the empire to Greece, the Balkans, Rymania, southern Russia and Armenia, and eventually to all of the known world. Byzantine architecture became the outstanding type in every Mohammedan and Christian land.

The Byzantine Empire surpassed the whole world in the making of mosaics, silks and embroidered satins. Through an experimental period, art and architecture developed into the golden age, and by the sixth century the mosaics were conventionalized and of great beauty. The most distinctive period was about 450 A.D., when the great Hagia Sophia was erected in Constantinople, and the early basilicæ in Rome. The artistry of the Near East centered in the Byzantine Empire. Leo III, however, hated sacred imagery, and destroyed such art, prohibiting its production. The artists, however, far from being discouraged, turned to Hellenistic motives and began to work in ivory and gold, at miniature painting and decorative design. By the middle of the ninth century they turned again to mosaic and painted figures, and from 867 to 1204 came a great period of classically inspired art. The finest extant masterpiece is the eleventh century San Marco at Venice, although examples of Byzantine treatment are existent almost all over Europe. The art is distinguished by richness of color, a set pageantry, a lack of representative or expressional meaning, and a blended decorative pattern.

See BELISARIUS; ISTANBUL.

C

C (*sé*), the third letter of the alphabet, represents two consonants: *s* and *k*. The *s* sound is called soft *c*, the *k* sound hard *c*. *C* before *e*, *i* or *y* is a hissing *s*, as in *cede*. When *e* or *i* is followed by another vowel in the same syllable, *c* is *sh*, as in *oceanic*. In a few words *c* is *z*, as in *sacrifice*. *C* before *a*, *o*, *u* or a consonant represents the *k* sound, as in *call, cold, culminate, climax*. *C* after a syllable not followed by *e* or *i* also equals *k*, as in *arc*. So, too, in *sceptic* and *scirrous*. It is silent in *corpuscle, czar, indict, muscle, victuals*. Its sound comes from the Latin. The Romans used C as a numeral (100) as well as a letter.

Cabal (*kȧ-băl′*), a word used to denote a small party united for political purposes. Formerly it was used to denote a secret committee or cabinet, and in the 17th century was especially applied to the infamous ministry of Charles II of England, which was made up of five members whose initials made up the word cabal. They were Clifford, Ashley, Buckingham, Arlington and Lauderdale. The word goes back through the French to a Hebrew word meaning received. In American history the word is used in connection with the infamous "Conway cabal," which was a conspiracy formed in 1777 among officers of the American colonial army to deprive Washington of command. After Gate's victory at Saratoga, it was plotted by Conway and others to promote him to supreme command. The plot was broken up.

Cabbage, a vegetable belonging to the mustard family. To the same family belong the turnip, lettuce, radish, shepherd's purse, sweet alyssum and cress. Wild cabbage still grows on the sea cliffs of the English Channel and of the Mediterranean Sea. It has thick and edible leaves, but they do not form a rosette. It is the parent of our cabbage, cauliflower, Brussels sprouts and kales. Of these, cauliflower has been developed farthest from the original plant, but this development was achieved by gardeners of an early period in history. It was well known to the ancient Greeks and Romans. The cauliflower head is in reality composed of huge flower buds. The cabbage proper is a compact head of leaves. Under ordinary and suitable conditions the cabbage forms a head the first year and, if the roots are protected, produces seed the second year. The plant then dies.

Cabell (*cȧ-bĕll′*), **James Branch,** an American author, was born in 1879 at Richmond, Virginia. He came of a family which had resided in the state since colonial days. His early education was received in private schools. He later matriculated at William and Mary College, and taught Latin and Greek there from 1896 to 1898. He graduated in the latter year with honors, being a member of Phi Beta Kappa and receiving other awards for scholarship.

Cabell's first work after leaving college was as a newspaper reporter on the Richmond *Times*. In 1899 he went to New York City and for the next two years worked as a reporter for the *Herald*. He returned to Richmond and worked for the *News*. In the eight years beginning in 1902 he devoted himself to writing, his first magazine articles and books appearing in this period. He next worked in the coal mines of West Virginia, 1911-13. When he returned to Virginia, he took an interest in genealogy and in historical research.

A large number of Cabell's novels form a series, which is referred to collectively as the "Biography of Manuel." This group of books comprise the history of the imaginary, medieval country of "Poictesme." Cabell had this country so clearly in his mind that he drew maps of it and fitted it with the legends and traditions of a royal state. The characters in the successive novels of the series begin with Dom Manuel, Count of Poictesme, and follow in direct lineage to his Virginia descendents.

Although Cabell had written a number of books prior to 1919, the suppression of *Jurgen* in that year made him a national figure. In the ensuing controversy over his books, there developed strong antagonists and ardent champions to attack and defend "Cabellianism."

The published writings of Cabell include: *The Eagle's Shadow* (1904); *The Line of Love* (1905); *Gallantry* (1907); *Chivalry* (1909); *The Cords of Vanity* (1909); *The Soul of Melicent* (1913), republished in 1920 as *Domnei; The Rivet in Grandfather's Neck* (1915); *From the Hidden Way,* verse (1916); *The Certain Hour* (1916); *The Cream of the Jest* (1917); *Beyond Life* (1919); *Jurgen* (1919); *Figures of Earth* (1921); *The High Place* (1923); *Straws and Prayerbooks* (1924); *The Music from Behind the Moon* (1926); *The Silver Stallion* (1926); *Something About Eve* (1927); *The White Robe* (1928); *The Way of Ecben* (1929); *Some of Us* (1930); and *Special Delivery: A Packet of Replies (to Ten Cor-*

respondents) (1933). *The Way of Ecben* was Cabell's farewell to the land of Poictesme, and he subsequently announced that he was through writing novels.

The book *Some of Us* is subtitled *An Essay in Epitaphs* and contains appreciations of several of Cabell's contemporaries, including Elinor Wylie, Frances Newman, H. L. Mencken, Sinclair Lewis, and Joseph Hergesheimer.

Cabinet, a committee of ministers, an executive council, so called from the cabinet or room in the council assembles. The British and the United States cabinets are the oldest, and are the types on which those of other countries are modeled. It is interesting to note that there is no provision in the United States Constitution for a Cabinet. The Constitution authorizes the President to require the opinions in writing of the heads of the executive departments of the government, and it also provides for the appointment of subordinate officers by department heads, but there is no hint in the Constitution of the creation of a Cabinet whose members meet and advise with the President in a body. President Washington established the Cabinet by calling the heads of the four executive departments together for consultation. The practice has become an unwritten law.

The first Cabinet consisted of the secretary of state, secretary of the treasury, secretary of war, and the attorney general. The secretary of the navy was added in 1798; the postmaster general in 1829; the secretary of the interior in 1849; the secretary of agriculture in 1889; the secretary of commerce and labor in 1903, and in 1913 this department was divided and the secretary of labor was added to the Cabinet.

The President presides at the meetings of the Cabinet. In recent years the Vice President has been invited to attend all Cabinet meetings. There is in the United States no premier or chief member of the Cabinet, but the position of secretary of state is generally regarded as the leading one. The President usually selects for his Cabinet those who agree with his political views and which belong to his political party. The Cabinet of Franklin D. Roosevelt is notable for having four members who were originally members of the Republican party.

The word cabinet was first used as a political term in England. The modern British Cabinet is made up a variable number of ministers, from ten to twenty. Among these are always the first lord of the treasury, who is Prime Minister, the lord chancellor, the chancellor of the exchequer, the president of the council, and the five secretaries of state. The members all must have seats in one or the other houses of Parliament. The British Cabinet is virtually a committee of the Parliament, and it constitutes the supreme executive authority of the nation. Since the time of George I, who had little knowledge of English, the sovereign has not attended meetings of the British Cabinet. In the self-governing British Dominions, in the constitutional monarchies of Europe, and in Japan, the cabinets are modeled after that of Great Britain. France is the outstanding republic with a Cabinet like that of the British. In Switzerland and the republics of the Western Hemisphere, the American model is followed.

Cable, a large strong rope or chain, also a submarine telegraph line. Rope cables are made of hemp or of wire. A hemp rope may vary in circumference from three to twenty-six inches. Wire has been taking the place of hemp for many uses. The four cables which support the great George Washington Bridge over the Hudson at New York City are each thirty-six inches in diameter, and consists of 26,474 galvanized steel wires placed parallel to each other, each wire being one-fifth of an inch in diameter.

After years of experimentation, the first telegraphic communication across the Atlantic by submarine cable was achieved in 1858. After something over a hundred messages had been sent, the cable ceased to work. A permanent cable was finally laid in 1866.

See Tables, Ocean.

Cable, George Washington, an American author, was born at New Orleans in 1844. His father died when he was fourteen years old. He was then forced to leave school and work. At the age of nineteen he entered the Confederate Army. At the close of the war he returned to New Orleans, where after a time he was employed as a writer on the *New Orleans Picayune.* His first stories were collected and published under the title of *Old Creole Days.* Other books which soon followed are *The Grandissimes, Madame Delphine,* and *The History of New Orleans.* In 1884 he removed to Northampton, Massachusetts, and devoted himself to writing and lecturing. Among his later works are *Dr. Sevier, The Creoles of Louisiana, The Silent South, The Cavalier, By-Low Hill,* and *Strange True Stories of Louisiana.* Cable died in 1925.

Cable-Road, a railroad on which the cars are moved by being attached to an endless wire rope, which is kept in motion by mechanical power. Cable traction has been used in mines for many years, but it was first successfully applied to street car traction by A. S. Halliday at San Francisco in 1873. For heavy street-car traffic and for places where there are very heavy grades the cable system has been successfully employed. The cable, an endless wire rope of one to 1½ inches in diameter, is kept in continuous motion in a slotted groove or conduit below the surface and between the rails, and the connection with the car is made by a grip which can be controlled from the car. The power required to keep the cable in motion without load is large—35 to 75 per cent of the full load—so that the system is at a disadvantage where the load is not heavy and continuous. The cable has been superseded by electric systems almost entirely.

Ca'bles, Electric, are wires especially prepared for carrying electric currents underground or under water. The underground cable consists essentially of a cylinder of insulating material, such as guttapercha, in which are imbedded one or more copper wires. These coppper wires do not touch each other throughout their length. The guttapercha keeps the moisture out and keeps the electric current in. The cable is generally placed inside a lead sheathing, which preserves its flexibility and at the same time furnishes protection from mechanical injury. It is now the custom to put a large number of conductors —sometimes, for telephone lines, as many as a hundred—in one lead sheath.

Ca'bles, Ocean, telegraph lines laid from shore to shore beneath the sea. The first Atlantic cable was successfully laid in 1866 by Cyrus W. Field. Submarine telegraph lines had already for some years been in operation over short distances. Coney Island and Fire Island had been successfully connected. In Europe a cable had been laid from Dover to Calais, and many others over distances less than a hundred miles. In deeper waters, also, cables had been laid, one from Newfoundland to Cape Breton and another from Spezia to Corsica. In 1857 Mr. Field made his first attempt to lay a cable under the Atlantic from Newfoundland to Valentia in Ireland. This attempt failed, as did several others. In 1858 a cable was laid which worked at first but became silent after a few weeks. In 1865 the *Great Eastern* took on board a vast cable weighing 20,000 tons, and laid 1,200 miles of it, when by a sudden lurch of the ship the cable was snapped. The next year's attempt was, however, successful. The cable, 2,000 miles long, was safely stretched across the ocean, and submarine communication was an accomplished fact. Its first message was the news that a treaty had been signed by Prussia and Austria.

By 1903 there were 16 cables carrying messages through the Atlantic Ocean, besides three that are no longer used. But the greatest triumph of cable-laying was the completion of the British Pacific cable, 7,800 nautical miles long, which now connects British Columbia with Australia. In 1903 an American cable was laid to the Philippines from San Francisco by way of Hawaii. Thus, by means of the overland telegraph and the submarine cable, it is now possible to transmit a message in a few hours to almost any country on the globe.

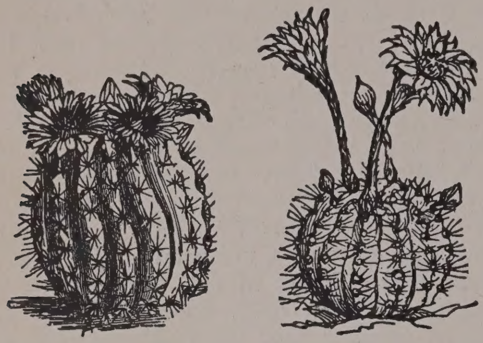
Submarine Cables are laid on the bottom of the sea. They require not only good insulation, but great tensile strength, else they will not support their own weights when lowered from the vessel to the bottom of the sea. This tensile strength is acquired by wrapping the guttapercha insulation with a sheathing of steel wire. There now are 16 cables of this type across the Atlantic Ocean, each carrying two copper conductors. Each of these conductors is capable of transmitting about 20 words a minute. See TELEGRAPH.

Cabot (*kăb'ŭt*), **John** or **Giovanni,** probably the discoverer of North America. Very little is known of the life of this seaman. The place and time of his birth and death are not known. Either a Venetian or an Englishman naturalized in 1476, he was living in England in 1495. It probably was the voyage of Columbus in search of the East Indies which started Cabot westward on the same quest. He with his three sons obtained a patent in 1496 from Henry VII, giving them power to search for lands in the eastern, western or northern seas and, as vassals of England, to occupy any lands discovered, with a right to their commerce on paying the king a fifth of all profits. Accompanied by his three sons he set sail in 1497, and on June 24th sighted Cape Breton Island and Nova Scotia. He planted on the coast the banners of England and Venice and returned. The next year another patent was granted, but nothing further is known of his life.

Cab'ot, Sebastian, son of John Cabot, was probably born between 1474 and 1477, either at Bristol or at Venice. He accompanied his father on his voyage to Nova Scotia, and in 1498 he sailed with two ships in search of a northwestern passage to India. He left a few men on the bleak shores of Newfoundland and sailed southward along the American coast as far as Florida. Later he entered the service of Spain, and in 1526 commanded an expedition which examined the coast of Brazil and the River Plata, and there attempted to plant colonies. In 1547 he again went to England and became inspector of the navy. He was the prime mover of the expedition of merchant adventurers which opened to England an important trade with Russia. He was famous as the maker of maps, and he was probably the first who made sure that America was wholly a new and unknown continent. He died at London in 1557.

Cabul. See KABUL.

Cac'tus. The general name of a well-known family called the *Cactaceæ.* The numerous species are characteristic of the warm and dry regions of America, their display being greatest in Mexico. There are about 1,000 recognized species, and many of them are under cultivation on account of their curious forms. They have become remarkably adapted to con tinuous drouth. Their leaves have been abandoned for the most part, and the variously shaped stems are organized to expose the least amount of surface and to retain water. The largest forms are species of the genus *Cereus*, among which are the giant cacti, whose columnar bodies with clumsy branches rise sometimes to a height of fifty to sixty feet. The spherical forms mostly belong to the genera *Mamillaria* and *Echinocactus;* the flat forms or prickly pear belong to the genus *Opuntia*. The common prickly pear has long been naturalized in the Mediterranean region. Many of the cactus fruits are edible, and certain genera are very useful to the natives of Mexico. Recent cultivation has produced a spineless cactus which promises to be of great value as a food for cattle. The flowers are usually very showy, and the spines are also often brilliantly colored. The eastern variety, prickly pear or Indian fig, is distributed in this country from Massachusetts to Florida; the western cactus ranges from Minnesota to Texas.



CACTI

Cade (*kād*), **Jack,** leader of the rising in England of the men of Kent, in 1450. He took the name of Mortimer and the title of Captain of Kent, and marched on London with over 15,000 followers and encamped at Blackheath. He complained of certain grievances, and asked the king (Henry VI) to change his counselors. He was forced to retreat, but later gained a victory over a part of the king's forces, and, entering London, beheaded Lord Say, one of the king's favorites. But his troops soon scattered, a price was set upon his head, and he was killed in a garden near Heathfield, Sussex, as he was trying to reach the coast.

Cad'illac, Michigan, a city, the seat of Wexford County, on Lake Cadillac, and on the Grand Rapids & Indiana and the Ann Arbor railroad, 96 miles north of Grand Rapids. It is in a region of fine hardwood timber and has large local lumber interests as well as considerable general manufacturing. It has a number of churches, schools and attractive public buildings. Population, 10,000.

Cadiz (*kăd'ĭz*), a Spanish city in Andalusia, near the Strait of Gibraltar, capital of the province of the same name. It is situated at the extreme end of a narrow tongue of land projecting from the Island of Leon. It is washed by the Atlantic and the Bay of Cadiz, and is one of the best fortified cities of Spain. The shining granite ramparts and the whitewashed houses give it a bright appearance; but there are few public buildings of note. The Alameda is a pleasant public walk by the seaside. After the discovery of America, Cadiz reached its highest prosperity, becoming the depot of all the trade with the New World. When the South American colonies became independent, the city declined greatly, but has since revived, owing to the extension of the railroad system and the establishment of new lines of steamers. About 3,800 ships enter the port yearly. There also are a number of manufactures. Cadiz was built by the Phœnicians, about 1100 B. C., under the name of Gaddir, meaning "fortress." It was afterward held by Carthaginians, Romans, Goths, Moors and Spaniards. Here Drake destroyed a Spanish fleet; Essex burned and pillaged the city; the French blockaded it; and the Spanish revolution of 1868 found its birthplace at Cadiz. Population, 67,174.

Cad'mus, in classical mythology a son of Agenor, king of Phœnicia, and brother of the beautiful Europa. When the latter had been carried off by Zeus, who had become enamored of the beautiful maid, Cadmus, his brothers and mother were sent in search of her. Not finding her, Cadmus proceeded to Bœotia, where tradition relates, he founded Thebes and built the Cadmeia. Here, the myth continues, he sowed dragon's teeth, which sprang up as armed men who slew each other, save a few from whom the Thebans later claimed descent. Subsequently, Cadmus married Harmonia, a flute-player, and both were changed by Jupiter (Zeus) into a serpent; though another account relates that he went to Illyria. The introduction of the Phœnician alphabet into Greece is attributed to Cadmus, while he is also said to have been the inventor of many useful arts.

Cædmon (*kăd'mŭn*), the earliest English writer of note who used his own Anglo-Saxon language, and the first religious poet of the Teutonic race. The account of him is given by Bede. He was a cowherd who had never until quite old learned any poem, and often, at festivals, when it came his turn to take the harp and sing, he would rise from the feast and go home. Once when he had gone from the feast to the stable, there appeared to him in sleep one who said to him: "Cædmon, sing me some song." "I cannot sing," was the answer; "for this cause left I the feast." "But you shall sing to me." "What," asked Cædmon, "shall I sing?" "Sing the beginning of created things." In the morning he told his dream to Hilda, the abbess of Whitby, and he put into verse for her a part of the Scriptures. Men believed him to be inspired. "Others after him strove to compose religious poems, but none could vie with him, for he learned the art of poetry, not from men, but from God." He was educated and became a monk, spending the remainder of his life writing poems on the Bible histories and on other religious subjects. He died about 680 A. D. Some of his poetry still exists.

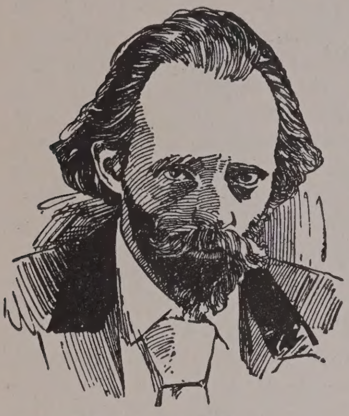
Cæsar (*sē'zer*), **Augustus.** See AUGUSTUS.

Cæsar, Gaius Julius, was born July 12, 100 B. C., of a noble Roman family. He studied at Rhodes to improve his eloquence, and, returning to Rome, threw himself earnestly into public life. Joining Pompey, who was then acting with the popular party, he passed rapidly through the different grades of office. He was quæstor in Spain; as curule ædile he increased his popularity by lavishing vast sums of money on public buildings and games; as prætor he was accused of being concerned in the famous conspiracy of Catiline, but probably unjustly. While consul, with rare tact and wisdom he reconciled the two most powerful men in Rome, Pompey and Crassus, and formed an alliance with them, known in history as the first triumvirate. At the close of his consulship he obtained the province of Cisalpine Gaul and the senate added that of Transalpine Gaul for five years, which were later increased to ten years. In this field Cæsar conducted during the next nine years some of the most wonderful campaigns in history, which alone would have given him an abiding name. In seven successive campaigns he subdued the Helvetii, killing over 150,000 of them, a number of German tribes, the Belgic tribes, the Veneti and other tribes; twice invaded Britain; built a bridge across the Rhine; and closed his brilliant course by crushing a wide-spread rebellion of the whole of Gaul. Twice during this time a thanksgiving was decreed to him by the senate, one for 15 days and the other for 20, an honor never before granted to any general. He now was the most popular man in Rome, and had an army enthusiastically devoted to their victorious leader. But Crassus was now dead, and Pompey, jealous of the power of Cæsar, had veered around to the party of the senate. Cæsar was ordered to disband his army, but, knowing that this meant his political ruin, he refused, and, crossing the Rubicon (a small stream which separated his province from Italy proper), moved swiftly amid the acclamations of the people toward Rome. Pompey and the senate fled to Greece, and in three months Cæsar was master of Italy. Pompey's legates in Spain were soon conquered, and by the famous battle of Pharsalia, 48 B. C., Pompey's powerful army was utterly routed. Pompey himself fled to Egypt where he was murdered. Cæsar next settled the affairs of Egypt, and defeated the generals of Pompey in Africa. His power was now absolute, but he did not use it for bad purposes, as previous conquerors had done, but, declaring that he had no enemies, gave himself to curing the social evils which had been so long rife in the republic. He was called the "Father of His Country" and "Imperator," from which comes the modern title of Emperor, and was made dictator for life. His person was declared sacred and even divine; his statues were placed in the temples; his portrait was struck on the coins; the month Quintilius was named Julius in his honor. He began many reforms, but was cut off in the midst of his work by assassins, and Rome was again plunged into civil war. Brutus and Cassius, both of whom had received favors from Cæsar, and a band of conspirators fell upon the great dictator in the senate house. At first he defended himself, but when he saw Brutus with a dagger in his hand, he cried *Et tu, Brute?* (Thou, too, Brutus?), wrapped his cloak about him, and fell pierced with 23 wounds at the foot of the statue of Pompey. He died at Rome, aged 56, in 44 B. C. Cæsar was one of the greatest men that ever lived. In everything he excelled. He not only was the first general and statesman of his age, but he was its greatest orator, except Cicero. He also was a great historian and scholar.

Cæsarea (*sĕz-ȧ-rē'ȧ*), now called by the natives Kaisarieh, was once a proud and splendid seaport. It stood on the coast of Syria, 13 miles north of Joppa. Built by Herod about 22 B. C., it was named in honor of Augustus Cæsar. It was a Greek town, with its temples, amphitheatre and baths, imported into Syria. A mole in a half circle, built of large blocks of stone, protected the port on the north and west, within which a fleet might ride in safety. It was held by the crusaders, who built a cathedral here. Afterward the city fell into decay, and is now a heap of half-buried ruins, with a few miserable stone houses inhabited by fishermen. There is a small, open harbor.

Cæsarea Philippi, a city mentioned in the New Testament, stood about 95 miles north of Jerusalem, near the source of the Jordan. The name Philippi was given in honor of Philip the Tetrarch, who repaired the city. It is now a heap of ruins. On its site is a small village called Paneas or Banias.

Cain, the first-born of Adam and Eve. A cultivator of the soil, he killed his brother Abel, because his brother's sacrifices were more acceptable to God than his own. For his crime he was condemned to be a fugitive and a vagabond on the earth. He went to the land of Nod, on the east of Eden, where he built a city, which he called Enoch from the name of his son.


HALL CAINE

Caine, Thomas Henry Hall, an eminent English novelist and dramatist, was born of Manx parentage in Cheshire, England, in 1853. His early years were spent as an architect, from which he drifted into journalism, thence into the writing of essays, poems and lastly novels. In fiction his first successes were in the writing of the Manx stories of *The Deemster*, *The Bondman* and *The Manxman.* Contemporary with these were *The Shadow of a Crime*, *A Son of Hagar* and *The Scapegoat.* All of his stories show power, with much constructive skill, and the qualities that attract and hold the reader's interest. His late novels are *The Christian*, which, with others of his stories has been dramatized, and *The Eternal City.* He has also published *Sonnets of Three Centuries* and a volume of *Recollections of Rossetti.* He has for some time been actively interested in the government of the Isle of Man, and is a member of the House of Keys.

Cairo (*kī'rō*), a famous city and capital of modern Egypt, lies on the right bank of the Nile, near the commencement of the Delta. The modern city is built on the remains of four distinct cities, and is surrounded by stone walls with antique battlements. It is divided into quarters, occupied by the Moslems, the Jews, the Christians, etc., and these quarters are separated by gates closed at night. The most remarkable buildings are the mosques and minarets, which include some of the finest remains of Arabian architecture. The great pyramid is about ten miles from the city. Cairo is also the site of a university, founded in 971, to which 2,000 students flock annually from all parts of the Mohammedan world. The streets are narrow and are traversed by an endless stream of horses, asses, camels and human beings. A few broad streets run through the newer parts of the city. With an area of about seven square miles and a population of about 654,476, Cairo is the largest city in Africa, and second only to Constantinople in the Turkish empire.

It was founded by the Arabs about 976 A. D., and was ruled by the Fatimite caliphs until 1171, when Saladin became master of Egypt. It was the capital of the sultans of Egypt until it was captured by the Turks in 1516. Since 1882 Cairo has been the center of British influence in Egypt. It is under the control of a special governor. Of the races which compose the population, the Arabs are the most numerous. There are about 35,000 Europeans. Railroads and telegraphs connect the city with Alexandria, Suez, etc., and steamers ply on the Nile. There is a busy trade, but few manufactures. There are good schools and a public library. The name Cairo is corrupted from *El Kahira*, meaning "the victorious." See Ball's *Cairo of To-Day.*

Cairo (*kā'rō*), a city, the capital of Alexander County, in southwest Illinois, situated at the confluence of the Ohio and Mississippi Rivers, about midway between Memphis and St. Louis. Its wharves are thronged with steamboats and shipping, as it is the shipping-point for southern markets of the products of Illinois, Iowa and Indiana. An extensive system of levees now protects it from inundation. It is well served with railroads and maintains excellent public schools, and has a population of 20,000.

Caisson (*kās'sŏn*), a water-tight box used in laying foundations on bases under water or undersurface soils which are saturated in water. There are two kinds, the crib or open caisson and the pneumatic caisson. The open caisson is a box structure of wood or of iron, which is loaded so as to sink into the bed of the stream; the earth is then removed to the required depth and the inside of the caisson is filled with masonry or concrete, the whole forming a portion of the pier. In making the foundations for the Poughkeepsie bridge, the caissons used had a cross-section of 60x100 feet and a depth of over 100 feet. Pneumatic caissons are all on the principle of the diving bell. A large cylinder of boiler iron with closed top is sunk into the water, open end down. The water is kept out by keeping the caisson chamber filled with compressed air. Communication for the passage of workmen and materials is through an air lock. This is an ante-room, having air-tight doors both to the atmosphere and to the compressed air chamber. The caisson is sunk by digging out the soil underneath the caisson. In modern pneumatic caissons the air chamber is a steel arched chamber at the bottom of the caisson tube, and the masonry or concrete is built in on top of this chamber as the caisson sinks. The air pressures used are often so great as to endanger life. Frequent shifts of workmen are required. In the Brooklyn bridge caissons pressures of ten atmospheres were used. Formerly caissons were used only for foundations in water, but within recent years the foundations for many of the tall buildings in New York city have been laid by means of pneumatic caissons.

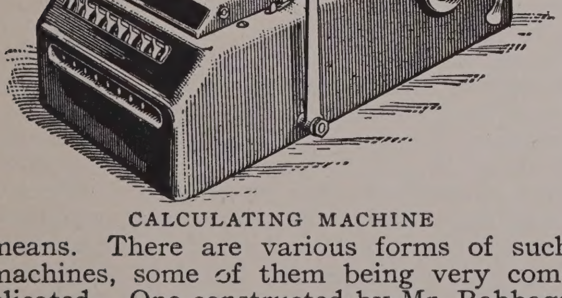
Calais (*kȧ'lă'*), a seaport of France, is situated on the Strait of Dover. A ring of forts and regions of marshy ground on the south and east which can be easily flooded make the city a secure fortress. Calais has a good harbor and is connected with Dover by steamer and by a submarine telegraph. Calais has been important in history. In 1347 it was captured after a siege of eleven months by Edward III of England. Calais was held until the time of Queen Mary (1558), when it was taken back by the French. It had been called the brightest jewel in the English crown, and the boast had been written over one of its own gates,

"Then shall Frenchmen Calais win,
When iron and lead like cork shall swim."

Population, 72,322.

Calcium (*kăl'sĭ-ŭm*) is a white, or as usually prepared in the laboratory, yellow metal. The metal is of no practical importance, but its compounds are very common. Limestone, marble and chalk as well as coral, shells, etc. are compounds of calcium carbonate; quick lime is the oxide; gypsum and plaster of paris consist of the sulphate; and calcium carbide is a manufactured compound used for making acetylene. The earthy part of bones is largely made up of calcium phosphate. It is chiefly calcium compounds that make water hard.

Calculating Machine, a machine for adding and subtracting by mechanical means. There are various forms of such machines, some of them being very complicated. One constructed by Mr. Babbage for the English government to be used in preparing logarithmical and trigonometrical tables is said to have cost $100,000. Practically all these machines are constructed upon one principle. There are a number of dial faces on wheels alongside each other, each with the first ten figures on them. These wheels correspond to units, tens, hundreds, etc., and are so interlocked that ten steps on the units dial move the tens dial one step and so on. By some mechanism any number that can be set up on the dials can be added to itself any number of times, and recorded on the same or another set of dials. Multiplication is taken as a successive addition and division as a successive subtraction. The best known of these machines are the Grant and the Thomas. They can be made to multiply or divide any number of figures by any other number, but with increased number of figures the machinery becomes more complicated. In a common form of Grant machine any number up to five figures can be multipled by any other number up to five figures. Thirteen figures are the limit of a common form of the Thomas machine. Forms of calculating machines are now used in banking work as well as in engineering and statistical work.



CALCULATING MACHINE

Calculus (*kăl'kū̆-lŭs*) means any method of making mathematical investigations by means of algebraic symbols. There are several sorts of calculus, but the term commonly means the infinitesimal calculus, that is, the principles of mathematical reasoning by the use of symbols that represent and express the infinitesimal increases (variations) of quantities. Arithmetic and algebra consider numbers to be finite and discontinuous, but calculus deals with them as capable of growth continuous and infinite. Hence calculus investigates quantities whose values constantly change. Such quantities, for example, are the motions of bodies, as of planets in their orbits, or the amounts of force in the performance of work, neither of which are identically the same at any two instants. Before calculus was invented modern science made but slight progress, but since Newton in 1665 and Leibniz, in 1675, both independently discovered it, science has progressed rapidly. (Leibniz published his discovery in 1684, Newton his in 1687, but Newton was the prior discoverer.) Differential calculus investigates the infinitesimal changes of quantities when the relations between the quantities are given. Integral calculus deduces relations between quantities from those between their infinitesimal variations. The influence of the calculus on nearly all branches of mathematics has been extensive, rendering possible most important advances in astronomy, mechanics and physics.

Calcut'ta, the capital of the province of Bengal and the metropolis of British

India, lies on the left bank of the Húgli River, an arm of the Ganges, about 80 miles by the river from the Bay of Bengal. The East India Company founded Calcutta in 1686, and it had gained some importance as a town when, in 1736, Surajah Dowlah, the Nawab of Bengal, captured the city, and the horrible tragedy known as the Black Hole followed. One hundred and forty-six English prisoners were thrown into a cell, 18 feet square, on a hot night in June. There were only two small windows, and these were obstructed by a veranda. The crush of the unhappy sufferers was horrible; and after a night of terrible agony from pressure, heat, thirst and want of air there were in the morning only 23 survivors, the ghastliest forms ever seen on earth. Seven months later the English recaptured the city. It was the seat of the central government of India from 1772 to 1911, when it was transferred to Delhi. The population of the city in 1911, with fort and suburbs, was 1,216,514. Besides these, thousands of the inhabitants of the surrounding districts flock during the day into Calcutta on foot, by boat or by railway to their daily toil. The city extends for about five miles along the river, with an area of nearly ten square miles; while other villages across the Húgli contain many of the government buildings. The city presents a striking appearance as it is approached by the river. On the left are the botanical gardens and the Bishop's College, and in the rear the suburb of Howra. On the right are the government dockyards and the arsenal, and beyond is the Maidan esplanade, which has been called the Hyde Park of India. Here, near the river, lies Fort William, the largest fortress in India, occupying with its outworks an area of two square miles. Among other fine buildings there is the government house, a magnificent palace. Beyond this, along the river bank, is the Strand, two miles in length, adorned by buildings and lined with a splendid series of jetties for ocean steamers. Calcutta has many modern conveniences. There are four theaters, several large European hotels, half a dozen daily newspapers, street railroads, etc. Although the native quarter is far behind the European quarter, it is fast improving. There are several lines of railroad to various parts of India, and the city is the headquarters of the Indian telegraph department. Steamers and sailing vessels supply connection with foreign countries. Besides the University of Calcutta, there are a large number of colleges, schools and learned societies. Calcutta is the commercial center of Asia. Both its sea trade and its inland trade are enormous. Opium, raw cotton, jute, grain, hides, etc. are the principal articles of export.

Calderon (*kăl'dẽr-on*) **de la Barca, Pedro,** a celebrated Spanish dramatist and one of the greatest dramatists of all nations, was born at Madrid in 1600, and was educated at the University of Salamanca. At fourteen he had written his third drama. He entered the army and served several campaigns in Italy and in Flanders, gaining a knowledge of men and things which he afterward made use of in his plays. He became a priest and royal chaplain, and died in 1681, still working at his literary labors. He wrote about 500 dramas. Among his greatest works are *The Constant Prince*, *Love is No Joke*, *Life is a Dream* and *The Physician of His Own Honor*. In later life he wrote many religious plays. His imagination was brilliant and his writings abound in beautiful passages. He is called the Spanish nightingale.

Caledonia. See SCOTLAND.

Calendar, Correction of. The calendar is based on three natural movements: the rotation of the earth on its axis, giving the day; the revolution of the moon around the earth in about 29½ days, giving the month and the movement of the earth around the sun, which, in connection with the inclination of the earth's axis to the plane of revolution, gives the succession of the seasons in a period of about 365¼ days. The month was the earliest standard, and the year was said to consist of 12 lunar months or 354 days. Of course this arrangement did not keep pace with the actual changes of the seasons. Consequently the Jews and the ancient Greeks, who adopted this form of calendar, used to put in a month every now and then—the Jews seven times in every 19 years, the Greeks three times in every eight years The old Roman method, however, is of more interest to us, because it is from them we get the names of our months. At first they had ten months, beginning with March and ending with December, which means the tenth month. Finding this did not work well, they put in two more months, January and February. This made their year 355 days long, or 10¼ days short. Of course this also did not keep pace with the seasons, so they let the priests put in a month whenever they thought it advisable; and the priests played all sorts of tricks with the year to suit themselves. Then the great Julius Cæsar called in a clebrated astronomer, Sosigenes of Alexandria. and between them they made what is called the Julian calendar. To do this they lengthened the year 46 B. C. to 445 days, and arranged that thereafter the year should be 365 days long, except every fourth year (which we call leap year), which is to have 366 days. The priests did not follow Caesar's directions, and so Augustus, his successor, had to straighten things out again in 8

B. C. These two calendar reformers gave their names to the months of July and August. The names and lengths of the months have been the same ever since. There was still a small error, however, for the real year, the circle of the seasons, is 11 minutes and a few seconds less than 365¼ days. Consequently, by making every fourth year 366 days long the calendar in every four years runs more than 44 minutes ahead of the seasons. By 1500 this error amounted to about 10 days. Then Pope Gregory XIII, on March 1, 1582, decreed that 10 days should be taken out of that year, so that October 5 should count as October 15. Moreover, in order that the mistake might not occur again, he decreed that years ending with two ciphers should not count as leap years, unless the first two digits formed of themselves a number divisible by four. Thus 1900 is not a leap year, but 2000 is. This means that in every four hundred years three leap years will be dropped, that is, three days omitted. We are now dating everything according to this Gregorian calendar. But it was not until 1751 that England adopted the Gregorian reform; and by that time the error in the Julian calendar had increased to 12 days. Parliament then decreed that the day after September 2, 1752, should count as September 14, omitting 11 days, greatly to the consternation of ignorant people. At the same time it was decreed that the year, which had before commenced with March 25 should henceforth begin with January 1. There have been no reforms since then in our calendar. Around 1752 it is not unusual to find two dates given, one according to the old or Julian style, and the other according to the new or Gregorian. The only countries that still adhere to the old style are those that belong to the Greek Church, such as Russia, Greece, Servia, Bulgaria, etc. At the time of the French Revolution the French invented a new calendar, but Napoleon I restored the Gregorian calendar to France.

Calgary (*kăl′gȧ-rī*), situated at the confluence of Bow and Elbow Rivers, is the largest and most important city in the Canadian middle west. It is only 70 miles east of the Rocky Mountains. Its situation seems to guarantee for it a continuance of its phenomenal growth. Years ago the Canadian Pacific Railway authorities regarded it as a fixed commercial center.

As a ranching center Alberta is unsurpassed in the whole world. For a considerable time southern Alberta was little else than an immense ranch. The west continued to grow, the railways extended farther and farther in all directions. Wheat-growing was tried with astonishing success and all was changed. A grain of wheat planted in the autumn and ripening in the summer brought about the change. Winter wheat has made Alberta famous. This fact is one of the guarantees of the growth and prosperity of Calgary, the population of which is now about 75,000. Another is the irrigation system which the Canadian Pacific Railway constructed on a scale larger than anything heretofore attempted on this continent. In this case irrigation is another word for intensive agriculture and a growing population. Thousands of acres of former grazing lands are proving through irrigation to be valuable winter-wheat lands.

Extensive coal-beds surround Calgary on all sides. The Canadian Northern Railway is using this coal, and it contributes to make Calgary a successful manufacturing center. West of Winnipeg, Calgary is the leading place for wholesale houses. Its educational facilities are a credit to its spirit of foresight and enterprise. Its normal school (a handsome well-equipped structure) furnishes adequate professional training for the district surrounding it. It also has prosperous churches and a good hospital. Calgary is the headquarters of the British Columbia Land and Irrigation Departments of the Canadian Pacific Railway.

The phenomenal development of Alberta is illustrated by the growth of Calgary, which was created in 1883 by the extension of the Canadian Pacific, and yet is the oldest city in the province. By 1901 it had over 4,000 population. Six years later, 21,000, and has since more than doubled the last named figure. Its substantial character is in direct contrast to the typical boom town, the buildings being largely of the brown Laramie sandstone found in the neighborhood of the city in the valley of the Bow, whose clear waters flow through Calgary, and untold ages ago cut the pass through which the main line of the Canadian Pacific crosses the Rocky Mountains.

The streets are wide, well paved. The ruins of Old Bow fort are one of the sights. Calgary is the headquarters of a C. P. R. general superintendent.

Calhoun (*kăl-hōōn′*), **John Caldwell** an American statesman, was born in Abbeville County, South Carolina, in 1782. He graduated at Yale College with high honors, studied law and after serving in the state legislature was sent to Congress. He took an active part in urging the war with England in 1812 and many other measures. After six years in the house of representatives, he became secretary of war in the cabinet of President Monroe, and in 1824 was elected vice-president of the United States, and four years later was again elected to the same office. He became about this time an advocate of free-trade, and believed in the doctrine of state sovereignty or state rights. He was the author of the *South Carolina Expositio* which declared that any state can make null and void unconstitutional laws of congress. Calhoun resigned before the close of his term, and was elected to the United States senate. He was secretary of state for a short time under President Tyler, and negotiated the so-called Tyler treaty for the annexation of Texas. He returned to the senate, where he remained until his death at Washington, March 31, 1850. Calhoun was one of the foremost of American debaters. It was Calhoun, Webster and Clay who were called "The Great Trio." His debate with Webster in 1833 on the nature of federal government was one of the most noted for eloquence and ability in the annals of any country.

See SOUTH CAROLINA; CLAY, HENRY; JACKSON, ANDREW; WEBSTER, DANIEL.

Caliban (*kăl'ĭ-băn*), the deformed slave of Prospero, in *The Tempest,* a play by Shakespeare. The word is evidently a corruption of cannibal, and the idea of the character seems to have been taken from Pigafetta's *Voyage of Magellan.* This account describes the cannibals of Patagonia, huge monsters who raged like animals, and called on Setebos. Caliban is such a monster, and also calls to Setebos. He is a spirit of the earth, unmoral, coarse, more beast than man, reasoning out of his darkened soul toward the light. The term "Caliban" has since been used to designate people of low intellect and animal-like tendencies. It has been applied also to miners and factory-workers in the days before labor regulations improved working conditions.

Caliber or **calibre** (*kal'ĭ-bẽr*), the technical name for the diameter of the bore of a firearm. Formerly, ordnance firing solid shot were distinguished by the weight of each shot, and only mortars and shell-guns by their caliber. It is now customary to designate guns heavier than eighty pounds by caliber, and guns lighter than eighty pounds by the weight of the shell. Machine guns and rifles are always designated by caliber.

Calico, originally any cotton cloth imported from India. To-day, the word is applied to white cotton cloth in England, and to cheap printed cotton cloth in the United States. The word calico is a derivation of Calicut, the seaport on the west coast of India from which the goods was first imported to Europe. The process of printing on cloth is ancient, and was practised in Egypt in the first century. Calico-printing was not introduced into Europe until the seventeenth century, yet Lancaster, England, is now the center of the industry. The old method of hand-printing by means of wooden blocks has been replaced by machinery using engraved cylinders of copper which revolve rapidly and print several colors at the same time. The manufacture of cotton materials, including calico, is a rising industry in the southern part of the United States, where 1,000,000 bales of cotton are annually woven into cloth.

See COTTON; TEXTILE PRINTING.

Calico Bass, a mottled-olive fish somewhat resembling the sunfish, which receives its name from the likeness of its coloring and designs to printed calico. It is also called *grass bass,* and *bar-fish.* Its habitat is the waters of the Mississippi Valley and the Great Lakes of North America. The calico bass has a length of twelve inches, and weighs two pounds, when full-grown. It is particularly fond of grassy streams and ponds, and can be successfully transplanted to stock other such waters than its natural habitat. It is highly prized as a food fish, and as game.

Calicut, a town and seaport in the province of Madras in India. Calicut is situated on the Indian Ocean, at the terminus of the southwest branch of the Madras Railway. This seaport was the first spot in India visited by the Portuguese trader Covilham, in 1486. It was also the first place at which Vasco de Gama touched the shores of India in 1498, having voyaged by way of the Cape of Good Hope. At that time, the seaport was prosperous and powerful. The Portuguese were twice repulsed at Calicut in 1500, and in 1509 their commander was slain there. By the time it fell into the hands of the English in 1792, however, the city was little more than a ruin, having never recovered from its sacking by Hyder Ali in 1765, when its treasures were taken away and punishment to Europeans meted out through its destruction. Since the English occupation it has progressed. It now has an important export trade in timber, spices, cotton yarns, coffee, oil, and tiles. Its population numbers 82,334.

California, the second largest State in the Union, is situated on the southern Pacific Coast and occupies over one-half of the Pacific coast line of the United States. It extends over an area of 158,297 square miles, 2,645 square miles of which are water. It is bounded on the north by Oregon, on the east by Nevada and Arizona, on the south by Mexico (Lower California), and on the west by the blue Pacific. This vast expanse of land and water is approximately 1,000 miles long and more than two hundred miles wide. Visitors to California are ever fascinated and stirred by its scenic beauty. A broad expanse of ocean, crystal clear lakes, sapphire skies, snow-capped mountain peaks, deep canyons, and enchanting forests where the famed redwoods hold sway majestically, reveal the true beauty of nature in unrivalled glory. The beauty of its cities with palm-lined boulevards, sandy beaches, "movieland," towering structures and imposing edifices, is but a magnet to those seeking romance and adventure. California is truly the "Golden State."

Surface and Drainage. California is a state of striking contrasts. Here one finds the highest land in the United States, excluding Alaska, in the summit of Mt. Whitney, in Inyo-Tulare County, which soars 14,496 feet above sea level. Here also, just seventy miles to the southeast of Mt. Whitney, is the lowest point in our country, in the bottom of Death Valley, 276 feet below sea level. In the southeastern corner of the state lies the vast area of the Colorado Desert, the hottest and driest region of the whole United States. Directly opposite, in the northwestern corner, are the dark forests of Del Norte County.

On the west the Coast Range Mountains, a series of parallel ridges, extend north and south the entire length of the state. The peaks of this range rise to an altitude of from 2,000 to 8,000 feet with the exception of the summits of the San Bernardino and San Jacinto which reach 10,650 and 10,805 respectively. Perhaps the most famous of other peaks in the Coast Range are Mt. Tamalpais and Mt. Diablo.

In the east and parallel to the Coast Range are the Sierra Nevada Mountains or the Snow Range. This rugged mountain system has its beginning in the southern part of Inyo County and extends northward to the Valley of the Pitt River. At this point it is separated from the Shasta Range. High altitudes abound along the Sierras. In the east its slopes are abrupt and rugged, but in the west, where rainfall and snow abound, its slopes are gradual, dotted with numerous mountain streams. The highest summits along this range, besides Mt. Whitney, are Fisherman Peak, 14,448 feet, and Mt. Corcoran, 14,093 feet. There are numerous other peaks ranging in altitude from 10,000 to 13,000 feet. To the north the Coast Range Mountains and the Sierra Nevada Mountains are connected by the Siskiyou Range, and in the south by the Tehachapi Mountains. Mt. Shasta, reaching an altitude of 14,380 feet, and Mt. Lasen, 10,570 feet are the principal peaks of the northern range. Mt. Lasen is the only active volcano in the United States proper. Prior to 1914 it was believed to be extinct, but in that year, between July 8 and 18, there issued a flow of steam and lava from its crater which caused considerable damage to the surrounding countryside.

These two ranges, the Coast Range and the Sierra Nevadas, divide the state into long narrow regions quite different in physical character. The coastal regions extend from the seaboard to the Coast Range. The interior is that trough-like depression between the Coast Range and the Sierra Nevada foothills which is sometimes called the Great Valley of California. This is one of the most fertile regions in the world. It extends over 400 miles in length and has an average width of eighty miles, the largest valley lying west of the Rocky Mountains. To the north in the interior lies Sacramento Valley, a region abundantly watered by the streams flowing down from the neighboring mountains into the Sacramento River. Some of these waters, the sparkling clear Merced River which mirrors the stupendous falls and granite domes of Yosemite Park, Kings and American rivers have created unusual canyons which have become internationally famous for their beauty. In the central interior lies the San Joaquin Valley which is cut off from the southern part of the state by the Tehachapi Mountains. This valley rivals the Sacramento in its great extent and its fertility, but lying further south, it is not so abundantly watered.

The lower Sacramento is the only navigable river in the state. There are numerous small streams which provide abundant water and make possible a well-developed system of irrigation, a system which has given California first rank among the states of the Union in irrigation. In 1932 there were 4,731,632 acres of land under irrigation. Other important rivers in the state are the Klamath and the Colorado on the Arizona boundary. There are many hundreds of lovely lakes of which Tahoe, the Lake of the Skies is the largest. It is situated in the Sierra Nevada Mountains. Its crystal clear water falls from the mountain snows. This lake, twenty-three miles long and thirteen miles wide, has the Rubicon Mountains on the one side and stately Mount Tallac, with its cross of snow on the other.

There are scores of magnificent waterfalls, such as those of the Yosemite Valley. There are stupendous chasms, bordered by minarets and towers, as King's River, Hetch-Hetchy, and Kern River Canyons. Rich mountain meadows and clear, cold trout streams abound above the timber line. The botanist, the fisherman, the hunter, the lover of out-door nature may wander for months in this wide wonderland among the clouds, travelling all the time and never seeing the same thing twice.

Climate. Just as the topography of California is so widely varied so is the climate of the state, a climate of which Californians are justly proud, which attracts a veritable horde of visitors annually. There are alpine climates in the Sierran counties; marine climates in the coastal counties; humid climates in the northern counties; arid climates in the eastern counties and semi-tropical climates in the southern counties. In the Colorado Desert rain seldom falls and the temperature often soars above 100° in the shade. To the northwest the rainfall in the dripping forests of Del Norte County is eighty inches per year. There are many thermal belts and local areas of special climatic conditions, such as Boulder Creek in Santa Cruz County, where the rainfall is more than eighty inches although surrounded by lands where it is only twenty inches or less. Other thermal regions are to be found in Imperial County, below the level of the sea, and in Butte County in the northern part of the state.

There are two seasons in California, the wet, which occurs from October to May, and the dry. Rainfall varies throughout the state from about eighty inches in some regions to two inches in the dry desert areas. From the freezing cold of the snow-capped mountain regions one may descend to the Sacramento, San Joaquin and Imperial Valley and experience a tropical heat. The climate of the state is thoroughly delightful and of particular benefit to those seeking a healthful clime.

Forests. Almost every variety of tree which grows north of the tropical zone may be found in California's extensive forest area. The majority of trees are coniferous. In 1932 there were nineteen National Forests in the state covering an area of 18,971,409 acres; four National Parks, Yosemite National Park being one of the largest and most beautiful, with an area of 928,021 acres; and nine State parks of 67,047 acres. Private timber land extends over an area of 5,800,000 acres. The principal timber trees are the giant redwood, Douglas fir, cedar, spruce, oak, and sugar pine. There are approximately 1,156,000 Sequoia trees in the state. In Sequoia National Park there are about 12,000 such trees more than ten feet in diameter. Many of these Sequoia trees are older than the Pyramids. Thousands of visitors are attracted to California's National Parks each year by the massive redwood trees. The sycamore, pepper, eucalyptus, cottonwood and fan palm trees are also found in various sections of the state. In desert regions the yucca tree is found. The dense forests of the northwest, however, are the principal regions of the lumbering industry.

Minerals. There are extensive mineral resources in the state. The Sierran region yields the gold that has given California the name of "the Golden State." Gold was first discovered here in 1848 in Sutter's Creek. The population in this region rapidly increased and the production of gold mounted until California became the leading gold producing region in the world. To-day California is the leading gold producing state in the Union. In 1932 the output of gold was valued at $11,791,000. Silver and copper are also mined. In 1932 there were 508,000 ounces of silver produced, valued at $143,000, and 5,514,000 pounds of copper.

Undoubtedly, the most valuable of the state's mineral products is petroleum. California is one of the three important petroleum producing states in the United States, the other two being Oklahoma and Texas. In 1932 the petroleum production totalled 178,128,000 barrels. The oil fields are located principally in the southern part of the state, along the western side of the San Joaquin Valley. Among the other minerals found here are lead, zinc and quicksilver. Gasoline is extracted from the natural gas found in the state. In 1932 there were 545,000,000 gallons of natural gasoline produced. In 1929 a conservation act was passed to prevent the waste of natural gas which is so abundant.

All of the borax mined in the United States is produced in California. Death Valley in Inyo County has become famous for its borax. On February 11, 1933, President Hoover proclaimed it a National Monument. This includes an area of about 1,601,800 acres. Telescope Peak, which reaches an altitude of 11,045 feet, is located in this region. In 1931 the output of borax totalled 206,405 short tons. There were 78,370 short tons of sodium carbonate produced in 1931 and 32,510 tons of sodium sulphates.

Precious gems are found within the state in great quantities. Tourmalines, beryls, kunzites and garnets abound in and about San Diego County while opals, jade, turquoise, diamonds and chrysoprase are found elsewhere in the state. Among other important minerals in California are manganese, molybdenum, onyx, gypsum, graphite, marble, magnesite, lime, mica, tin, and antimony.

Agriculture. The variety in surface and climate makes a corresponding variety in the soils, the crops, and the activities and occupations of man. In the extreme northern part of California the soil consists of much lava and volcanic ash from extinct volcanoes. In the south the soil is clay, sand, or sandy loam. Irrigation has done much for the development of agriculture, the principal industry. In 1930 there were 135,676 farms in the state with 30,442,581 acres. The interior of California on the north consists of Sacramento Valley, an empire of agricultural land. It is abundantly watered by mountain streams and the soil is deep and rich, adapted to all the agricultural and horticultural products of the temperate zone.

The principal cereal crops, with their production in 1932, are maize, 1,488,000 bushels; wheat, 11,780,000 bushels; oats, 2,149,000 bushels; barley, 39,498,000 bushels; rice, 3,168,000 bags, and beans, 2,461,000 bags. The most valuable of the state's crops is hay, the yield in 1932 being 4,768,000 tons from 1,764,000 acres. California is the leading state in the production of alfalfa, the output of which in 1932 totalled 2,836,000 tons. In that same year there were 6,600,000 pounds of hops produced and 126,000 bales of cotton.

The regions of the southern interior are largely devoted to the growing of citrus fruits. It virtually is a reclaimed desert. All the fruits and flowers of the temperate and semi-tropic regions thrive here. California is the leading state in the Union in the production of the following fruit crops (with their production in 1932): wine grapes, 388,000 tons; table grapes, 317,000 tons; raisin grapes, 1,177,000 tons; oranges, 33,400,000 boxes; lemons, 9,200,000 boxes; pears, 9,917,000 bushels; figs, 23,000 tons; peaches, 26,836,000 bushels; apricots, 270,000 tons; plums, 68,000 tons; prunes, 181,000 tons; olives, 22,000 tons; almonds, 14,000 tons; and walnuts, 44,000 tons. The grapefruit production, in which California is excelled by Florida, was 2,200,000 boxes in 1932. In that same year these were 9,045,000 bushels of apples produced and 18,000 tons of cherries. The fruit industry of California is thoroughly organized. Such organizations as the "Sun-Maid" Raisin Growers' Association at Fresno; the California Fruit Growers' Exchange at Los Angeles and other cities; and the California Walnut Growers' Association, grade and market all fruit at prices fixed by the organization. The United States Department of Agriculture has done much towards assisting the development of agriculture in the state by introducing new plants and promoting scientific farming.

The middle coast is devoted to dairying. The cool, even temperature and abundant moisture produce fine pasturage nearly all year round. On January 1, 1932, there were 190,000 horses, 38,000 mules, 782,000 milch cows, 1,886,000 all cattle, 3,444,000 sheep, and 672,000 swine, on farms throughout the state.

Industry. The principal industry of the state is petroleum refining. In 1929 there were fifty-four refineries in which there were 7,586 employés. The production for the year 1927 was valued at $356,910,953. Other important industries include meat packing, the canning and preserving of fruits, vegetables, and sea food, and lumber, timber, and planing mills. The development of manufacturing was long hindered by lack of coal. The discovery of petroleum, however, was a great impetus to the progress of industry. The creation of electric power, generated by mountain streams has been transmitted over long distances to coast cities. On January 1, 1933, developed water power in the state aggregated 2,447,736 horsepower, with 6,674,000 potential power fifty per cent of the time awaiting development.

In considering the principal industries of California we must not overlook or underestimate the value of the motion picture industry. California leads the world in the production of motion pictures. The majority of studios are situated in Hollywood, a suburb of Los Angeles, in Culver City, Santa Monica, and Glendale. In 1929 there were fifty-eight studios in which there were about 8,052 employés. Motion picture production for that year was valued at $129,391,172. Other important industries are lumbering, the manufacture of flour, dairy products, beet sugar, and the construction of locomotives and railway cars. In 1929 the United States census of manufactures reported a total of 12,003 industrial establishments in the state of California which employed 290,702 persons. These employés earned $418,797,162 creating products valued at $3,104,086,175.

Transportation and Communication. On January, 1931, there were 18,317 miles of steam and 3,120 miles of electric railways. The two important continental railway systems, the Southern Pacific and the Atchison, Topeka and Santa Fe, either own or control the principal railway lines in the state. In 1919 the San Diego and Arizona Railway was put into operation, affording direct east and west connection between San Diego and the railway lines of the Southern Pacific at Yuma, Arizona. There are suburban electric lines radiating from San Francisco and Los Angeles. These two cities are also terminals for transcontinental air mail and passenger lines.

California is well-known for its excellent highways. In 1932 the State maintained 7,350 miles of highway, 5,214 miles of which were State constructed. There were 76,964 miles of highway of which 25,647 were surfaced roads. There were 485 automobile, stage and truck lines operating on California highways in 1930. On January 1, 1933, there were 1,738,385 automobiles and 233,231 trucks registered in the state, a number exceeded only by the state of New York.

Commercially, California is the gateway to the Orient. The coast line, of more than 1,000 miles in length, has two of the most important harbors on the Pacific Coast, San Francisco Bay and San Diego Bay. The spacious and noble harbor of San Francisco floats the ships of the world. Other excellent harbor facilities are provided at San Pedro Bay (Los Angeles harbor), which is protected by an extensive breakwater constructed by the United States government, at Humboldt Bay and Tomales Bay. Since the opening of the Panama Canal on August 15, 1914, the commercial importance of California has been greatly increased. Foreign ships from Europe and the Orient ply regularly through the canal to the port of San Francisco. Traffic is also carried on between cities along the Pacific Coast.

More than 1,000,000 tons of freight and over 100,000 passengers are transported annually over the Sacramento River which is navigable for 180 miles. The San Joaquin, a branch of the Sacramento River, has been dredged to provide a twenty-six foot tide water channel 300 feet wide to Stockton. The cost of construction was $60,000,000. In February, 1933, Stockton, situated eighty-eight miles from the Pacific, became the newest inland port in the United States. Work was also begun in 1933 on two new bridges, the San Francisco-Oakland Bay Bridge and the Golden Gate Bridge. Both are scheduled for completion in 1937. The former is to be 22,720 feet long, with two suspension spans each 2,310 feet long and one cantilever span 1,400 feet long with clearances from 165 to 240 feet. The bridge will stretch eight and a quarter miles across San Francisco Bay by way of Yerba Buena Island. The cost of the project, which affords employment to about 6,000 men, will be $75,000,000, to be financed jointly by the State and the RFC (Reconstruction Finance Corporation).

The Golden Gate Bridge is a 6,400 foot long suspension bridge with a center span of 4,200 feet. The cost of this project has been estimated at 32,000,000.

Population. In 1930 California had a population of 5,677,251, an increase of 2,250,390 or 65.7 per cent over that of 1920. Of the total population 73.3 per cent were urban. There are more Asiatics in California than in any other state in the Union, 37,361 Chinese, 97,456 Japanese, and 30,470 Filipinos. Three-fourths of the entire population were of American birth; 810,034 were foreign-born whites; 368,013 were Mexican; 107,249 Italian; 101,445 Canadian and 81,048 Negro. In 1931 there were twenty-seven Indian reservations in the state extending over an area of 899 square miles, on which 19,251 American Indians dwell.

The principal cities, with their population in 1930, are: Los Angeles, 1,238,048; San Francisco, 634,394; Oakland, 284,063; San Diego, 147,995; Long Beach, 142,032; Sacramento, the State capital, 93,750; San José, 57,651; and Fresno, 52,513.

Education. California has long been recognized as one of the most progressive states in the Union in its education system. Education has become compulsory for children from eight to sixteen years of age for at least eight months out of the year. Illiteracy, which in 1920 was 3.3 per cent, had decreased to 2.6 per cent in 1930. Public schools are organized under a state board of education and a state superintendent. In 1930 state conferences were held throughout California to bring about better coördination of the vast educational groups in the state. The teachers in the state are especially well trained and a higher standard of qualifications is required here than in other states. Consolidated rural schools have been established in sparsely populated districts taught by well qualified teachers. In 1931-32 there were 1,894 kindergartens with 1,904 teachers and 78,573 pupils; 4,025 elementary schools with 23,675 teachers and 701,129 pupils; and 641 public high schools, 169 of which were junior high schools. There were 20,804 teachers in these high schools and the enrollment totalled 655,308 pupils. Seven teachers' colleges are maintained by the State in which, during 1931-32, there were 13,875 students.

There are three famous universities situated in this region, the University of California (a State university), Leland Stanford Junior University, and the University of Southern California. The University of California was founded in 1868, a federal land grant college. Classes were held in Oakland. In 1873, however, the institution was removed to Berkeley. An architectural plan was adopted for its campus and buildings in 1898, a plan which has been followed down to the present day. In 1933 there were 21,292 students registered at Berkeley and the faculty numbered 1,779. Colleges for resident instruction and research are maintained by the university at Berkeley, San Francisco, Los Angeles, Mount Hamilton (the Lick Astronomical Department), Riverside, Davis and at La Jolla (the Scripps Institution of Oceanography).

Leland Stanford University was chartered in 1885 and opened near Palo Alto in 1891. In 1933 there were 3,550 students and a faculty of 575. The original endowment, including large landed estates, was presented by Mr. and Mrs. Leland Stanford as a memorial to their son.

The University of Southern California is a Methodist Episcopal institution. It was organized in 1879 at Los Angeles. In 1933 it maintained a faculty of 450 and had a registration of 9,000 students. Other institutions of higher learning are the California (State) Polytechnical School at San Luis Obispo, and Santa Clara College at San José.

The world's largest telescope, the 100-inch instrument, is mounted at Mt. Wilson Observatory. The world's largest eye, a 200-inch telescope, now under construction, will be assembled at the California Institute of Technology at Pasadena. Another famous observatory is situated on Mt. Hamilton, Lick Observatory.

The State maintains schools for the deaf and blind at Berkeley.

Government. The State Constitution, which was adopted in 1849, was amended in 1911. After that date the initiative and referendum were provided for and women were granted the right to vote on an equal basis with men. Each member of the executive department, the governor, lieutenant-governor, secretary of state, comptroller, treasurer, attorney-general, and surveyor-general, are elected for four-year terms. The Senate is composed of forty members. Senators are elected for four years, half of their number, however, being elected every two years. The Assembly is composed of eighty members who are elected for two years. Regular sessions of the legislature are held biennially. The State capital is Sacramento.

The State is divided into fifty-eight counties. San Francisco, one of these counties, has a combined county and city government in which the legislative authority rests in a board of fifteen supervisors who are elected from the city and county at large. Each of the other fifty-seven counties is governed by a board of five supervisors elected from districts.

History. It was the early Spanish explorers, Alarcon in 1540, and Juan Rodrigues Cabrillo in 1543 in particular, who probably gave this state its name. Entering this region from the south, Lower California and Mexico, they called the land *caliente forno,* Spanish words meaning "hot furnace." The name "California," it is believed, is a contraction of the Spanish. The history of these early years in California is indeed vague. The coast was visited by Sir Francis Drake in 1579. In 1602 Vizcaino explored these regions. In 1769 the first settlement was made at San Diego by a group of Franciscan missionaries under the leadership of Junipero Serra. There followed a mission period of about fifty years. A chain of twenty-one missions for Christianizing the Indians was built along the coast by the Franciscan fathers. These missions, reaching from San Diego in the south to Sonoma in the north, became rich in flocks and herds and choice lands. The social life and political history of California revolved around them. Among these famous missions were San Luis Rey, San Juan Capistrano, San Gabriel, San Buenaventura, Santa Barbara, Santa Ynez, San Luis Obispo and Monterey. In 1821 this land passed from the rule of Spain to that of Mexico. The Mexican government secularized these missions in 1834 and confiscated their property. During the next few years the Mexican governors of California granted their rich land to Spanish and Mexican families. Down to 1846 California was politically associated with Mexico. In 1846 a group of Americans under the leadership of John C. Frémont, seized the town of

Sonoma, declaring California's independence. On July 5, of that same year, the American flag was hoisted at Monterey by Captain Sloat of the United States Navy. A proclamation followed declaring California to be a portion of the United States. On August 15, 1846, California was proclaimed a "Territory of the United States." At the close of the Mexican War, the treaty of Guadalupe-Hidalgo, February 2, 1848, contained terms whereby the territory was ceded to the United States by Mexico. It was in this same year that gold was discovered at Sutter's Creek, near Coloma in the Sacramento Valley. "The Argonauts," gold seekers, fairly poured into the valley and by the close of 1849 the population had increased to approximately 100,000. The State Constitution, which prohibited slavery, was formulated on November 13, 1849. California attained statehood on September 9, 1850.

California gold continued to attract settlers from the east. There were no railways to make the trip enjoyable, rather was it accomplished by the Merchant's Express, a wagon and oxen journey. It was not until 1863 that work was begun on the Central Pacific Railroad (Union Pacific). The road was not completed until 1869 when Governor Leland Stanford drove the golden spike at Promontory, Utah, which marked the completion of the project. In the years which followed there were completed the Southern Pacific in 1877 and the Atchison, Topeka and Santa Fe lines in 1885.

Several disasters have been witnessed by California's inhabitants. The San Francisco earthquake and fire in 1906 laid waste a large part of the city. To-day, however, this cosmopolitan city, one of the greatest of American cities, restored and modernized after the fire, attracts thousands of visitors from every nation to its Golden Gate, Fisherman's Wharf, The Presidio, Portsmouth Square, Telegraph Hill, Golden Gate Park and its Chinatown of world-wide fame.

In 1928 the breaking of the St. Francis Dam caused considerable damage to both life and property. Its disasters have never overshadowed its scenic beauty nor the glow of its Southern sun so prized by native Californians, and so magnetic to travellers.

For further information see the following articles in these volumes:

Surface and Drainage. Cascade Mountains; Coast Range; Rocky Mountains; Whitney, Mount; Death Valley; Mohave Desert; Yosemite Falls; Yosemite Valley; Colorado River.

Minerals and Mining. Petroleum; Gold; Silver; Copper; Lead; Zinc; Quicksilver; Mining.

Crops. Alfalfa; Apricot; Barley; Cherry; Cotton; Fig; Grape; Grapefruit; Lemon; Olive; Orange; Peach; Plum; Prune; Raisin; Walnut.

Other Products and Industries. Borax; Cattle; Gas; Lumbering; Sequoia; Motion Pictures; Petroleum; Poultry; Wine.

Biographies. Burbank, L.; Harte, F. B.; Hearst, William R.; Hoover, Herbert C.; Johnson, Hiram W.; Miller, C. H.

Cities. Alameda; Bakersfield; Berkeley; Fresno; Long Beach; Los Angeles; Oakland; Pasadena; Pomona; Riverside; San Bernardino; San Diego; Sacramento; San Francisco; San José; Santa Ana; Santa Barbara; Santa Cruz; Santa Rosa; Stockton; Vallejo.

Additional References. Catalina Islands; Eucalyptus; Lick Observatory; Condor.

California, Gulf of, an arm of the Pacific Ocean between Lower California and Mexico. It was originally known as the sea of Cortéz, named from the Spaniard who discovered and explored it. It is 700 miles long and varies in width from thirty to 150 miles, with a depth of from 600 to 6,000 feet. The Colorado River empties into the upper end of the Gulf, and from the east it receives the waters of several rivers, including the Altar, Sonora, Yaqui, Mayo, and Fuerte. Its irregular coast line is indented with many small bays. On the east are highlands with river valleys, but the west shore is an almost unbroken mountain chain. Mazatlan and Guaymas are important ports on the eastern shores, and San Felipe, San José, and La Paz on the western. There are a number of islands in the gulf, the largest being Angel de la Guarda and Tiburón. Pearl oysters are to be found especially along the western coast.

California, Lower or **Baja,** a peninsula of the southern part of North America, and a territory of Mexico, is separated from Mexico by the Gulf of California. It is over 750 miles long, and varies in width from thirty to 140 miles, extending over an area of 58,343 square miles. The surface of the country is mountainous, rising as high as 10,000 feet in the north. The climate is dry, and there are few streams and harbors. Little farming is done except in some of the valleys, but the vintage of certain parts of the country is famed. Whale-fishing is carried on from the west coast and there are pearl fisheries on the gulf. Salt, and a violet dye called orchil, are also obtained here. The capital is La Paz. Other important cities are Mexicali, near the northern border, and Tia Juana, just across from San Diego, which is famous for its race track sports. In 1930 the population of Lower California was 94,469.

California Jack, a card game somewhat similar to *All Fours* or *Seven Up*. The game is ten points, each game counting one.

Caligula (*kȧ-lĭg′ū-lȧ*), **Caius Cæsar Augustus Germanicus,** a Roman emperor from 37 to 41 A. D., was born in 12 A. D., the son of the popular Germanicus. In the camp he was nicknamed Caligula or Little Boot, from the soldier's boots which he wore. On the death of Tiberius he was appointed heir, together with the grandson of the emperor; but the senate made him sole emperor. At first he was lavishly generous and merciful, although at the same time very sensuous, but he soon became mad, and his cruelty knew no bounds. He banished or murdered his relatives and many of his subjects, victims were tortured and slain in his presence while dining, and he uttered the wish that all the Roman people had but one neck, that he might strike it off at one blow. He built a bridge across the Bay of Baiæ, and planted trees and built houses upon it, that he might say he had crossed the sea on dry land. In the middle of the bridge he gave a banquet, and at the close had a great number of the guests thrown into the sea. He made his favorite horse a priest and then consul, and also declared himself a god, and had temples built in his honor. At length his subjects could stand him no longer. A conspiracy was formed against him, and he was assassinated.

Calor′ic, a hypothetical fluid formerly employed to explain the phenomena observed in the study of heat. When the temperature of a body was raised, it was supposed that caloric was added to the body; when the temperature fell, it was explained by saying that caloric had been taken from the body. Caloric was supposed to be indestructible, uncreatable and imponderable. In having no weight, it differed from ordinary matter. When heat was added to a body—such as melting ice or boiling water—without changing its temperature, the fact was explained by saying that the caloric became latent and inactive, so that it could not be detected by a thermometer.

Cal′vary, the Latin translation of the Hebrew name Golgotha, a skull. It is situated north of Jerusalem and outside the walls. The place took this name either from being mound-shaped like a skull or from its being the place of public executions It was the scene of the crucifixion of Christ, and his body was placed in a tomb in a garden near by. In Catholic countries the term Calvary is given to a mound or hill crowned with one and sometimes with three crosses, bearing life-like figures of Christ and the two thieves, and occasionally surrounded by figures representing those who took part in the crucifixion.

Calve (*kȧl′vā′*), **Emma de Roquer,** a soprano opera-singer, of Franco-Spanish origin, who has achieved great fame on the stage, was born in France in 1866. In 1882 she made her *début* at Brussels in Gounod's *Faust,* and since then her career has been one long triumph. Her chief successes have been in the rôles of Santuzza, in *Cavalleria Rusticana,* in *L' Amico Fritz* and in *Carmen.* She has made successful tours through most of the capitals of Europe, as well as through the chief cities of the United States.

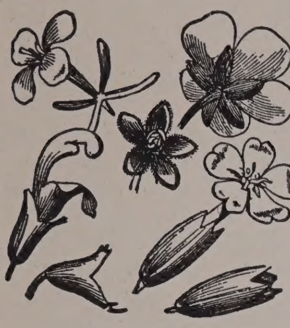
Calvert, Cecil. See BALTIMORE, LORD.

Cal′vin, John, one of the most noted reformers of the 16th century, was born at Noyon, in Picardy, July 10, 1509. He was well-educated, directing his attention first to the study of law. While a law student at the University of Orléans, he first became acquainted with the Scriptures through a relative, Pierre Robert Olivetan, who was making a translation of them. He began preaching the reformed doctrines at Bourges. In 1533 he went to Paris, where the new doctrines were popular under the influence of the queen of Navarre, sister of Francis I. The king, however, soon took active measures against the new religion, and Calvin, with others, fled for their lives. He went to Basel, where he is thought to have prepared his *Institutes of the Christian Religion* and to have written the celebrated preface addressed to Francis I. He visited his native town, sold the home, and with a younger brother and sister set out for Strassburg. The direct road was dangerous, because of the armies of Charles V, and Calvin took a route that led him through Geneva. Here he met Farel, who was struggling to promote the Reformation in that city, and induced him to give up the journey to Strassburg and join with him in the Reformation. At first Farel and Calvin were successful in their work at Geneva. A Protestant confession of faith was drawn up and approved by the Council of Two Hundred, the largest governing board of the city, and made binding upon all the citizens. But the party opposed to their rule triumphed, and expelled Calvin, who then proceeded to Strassburg. Here he busied himself with his studies on the New Testament. He was, however, recalled to Geneva by the people, and after a 15 years' struggle his rule was firmly established. The condemnation of Servetus and his death by fire belong to this period of Calvin's life. His share in the tragedy is uncertain. It is certain that he forwarded to the authorities private documents which Servetus had intrusted to him, and also certain that he used his influence to have the mode of death changed. Calvin died at Geneva, May 27, 1564. Besides his well-known *Institutes of the Christian Religion,* he wrote commentaries on nearly all of the *Old Testament* and on most of the *New Testament,* except *Revelation,* so that he ranks as one of the greatest commentators.

Calypso (*kȧ-lĭp′sō*), in Greek legend, a daughter of Atlas, who dwelt in the solitary wooded isle of Ogygia far apart from gods and men. Odysseus (Ulysses) being thrown upon her island by shipwreck, she treated him kindly and promised to make him immortal if he would marry her. Though fascinated, he refused to desert his wife and his native island. She detained him, however, seven years, and on his departure died of grief.

Calyp'tra (in plants), a loose hood which rests upon the apex of the spore-case of mosses. See Musci.

Ca'lyx (in plants), the outer set of floral leaves, each leaf being called a sepal. See Flower.



FORMS OF CALYX

Camb'ium (in plants), the layer of living cells between the wood and bark, which has the power of making additions to both. Such cells have the power of dividing and thus forming new cells, on the inside adding new wood cells, thus adding each year to the rings of wood, and on the outside new bark cells. Cells with this power of division are generally knows as meristematic cells, and cambium is merely a meristem which occurs between wood and bark. These delicate cells are exposed when bark is peeled from a tree, forming the glairy, mucilaginous substance which makes the line of easy cleavage.

Cambo'dia, a state in Indo-China under French control, on the lower course of the Mekong River, south of Siam. It is 220 miles long and 150 miles broad, with an area of 37,400 square miles, not including the region ceded to France in 1907 by Siam. Along the coast are several islands, one bay and but one port, Kampot. Its external trade is carried on mostly through Saigon in Cochin China. The mountains in the north and west contain iron, limestone, sandstone and some copper. The greater part of the country consists of plains of rich loam, which yield abundantly with almost no cultivation. The main river, the Mekong, flows through the country in a generally southwesterly direction. Great Lake has an area of 100 miles by 25, and its greatest depth is 65 feet. Rice, cotton, indigo, betel, tobacco, maize, cinnamon, pepper, sugar-cane, etc. are raised; and among the animals are the elephant, tiger, panther and rhinoceros. Crocodiles are found in most of the rivers. The people are tall and robust, copper-colored, with long skull, flat nose and eyes slightly oblique. They are, however, indolent and passive from long oppression and because of the little work required for subsistence. Fishing in Great Lake is the main industry. Lines of steamers ply on the Mekong. Pnom-Penh, the capital, has a population of 50,000. Here is a large school, with two French professors and a native teacher. The religion is developed from Buddhism, the worship of ancestors forming an important part. The language is much like those of Siam and Anam. The ancient kingdom of Cambodia or Khmer extended over a large part of Indo-China. In the 17th century it was dismembered, and Anam and, later, Siam acquired large portions of it. The Portuguese in the 16th century were the first Europeans to enter the country, and were followed by the Spaniards and the Dutch. In 1858 France first appeared in Indo-China, and in 1863 made a treaty with Norodom, king of Cambodia, by which Cambodia was placed under a French protectorate. Cambodia has now placed over it a resident-general under the governor-general of Indo-China. The most remarkable thing in Cambodia is the splendid ruins of the architecture of the Khmer kingdom. The temples, palaces and monuments scattered everywhere are wonderful for their size and artistic grandeur. In a single temple there are 1,532 columns. Among the ruins are also massive stone bridges, one measuring 470 feet in length, with 34 arches. The present inhabitants look upon these structures of their ancestors as the work of angels or giants. Population about 1,500,000 See Cochin China

Cambon (*kän'bôn'*), **Jules Martin,** French diplomat, and plenipotentiary to Washington in the interest of peace with Spain at the close of the Spanish-American war, was born in Paris in 1845. He served with distinction in the French army during the Franco-Prussian War of 1870, and later served his government as confidential adviser in Algeria, where he became (1891–97) governor-general. In August, 1898, he signed the peace protocol on behalf of Spain, and was rewarded by being made a commander of the Legion of Honor. He became ambassador to Spain in 1902 and in 1907 was transferred to Berlin.

Cam'bridge, a suburb of Boston, with which it is connected by a subway under the Charles River. Harvard University, for which the city is largely noted, is in Cambridge, and its fine buildings and its campus filled with beautiful old elm trees are among the most interesting sights in the city. Cambridge is also the seat of Radcliffe College and Massachusetts Institute of Technology. It has many points of historic interest such as the old elm tree under which Washington took command of the American army; the house in which the poet Longfellow lived and which once was Washington's headquarters; the home of James Russell Lowell; the church in which Lord Cornwallis is said to have stabled his horses; and Mount Auburn Cemetery, one of the most beautiful burial-places in America. Cambridge is now known as one of the principal industrial cities of New England. The leading industries are baking, the manufacture of automobiles, automobile accessories and other machine parts, printing, publishing and bookbinding, confectionery, musical instruments, furniture and pianos. The first book published in the United States was published in Cambridge. The public schools are among the best in the country, and the city has an excellent free public library well-stocked with books. Cambridge was settled in 1630 by Governor Winthrop and other prominent men. The first ministers of the place, as well as most of the educated men, were graduates of Cambridge University, England. The American army was encamped here during the Revolution, while the British had possession of Boston. The tax for wooden palisades around Cambridge in 1632 led Watertown Township to make the first protest in America against taxation without representation. Population, 111,000.

Cam'bridge, Ohio, a city and county-seat of Guernsey County, 55 miles north of Marietta. In the surrounding region are coal, pottery-clay and natural gas. Cambridge manufactures glass and pottery, iron and steel products. The city is served by two railroads and suburban electric line, was settled in 1804, and incorporated in 1887. Population, 15,000.

Cam'bridge, Ada. See CROSS, MRS. GEORGE FREDERICK.

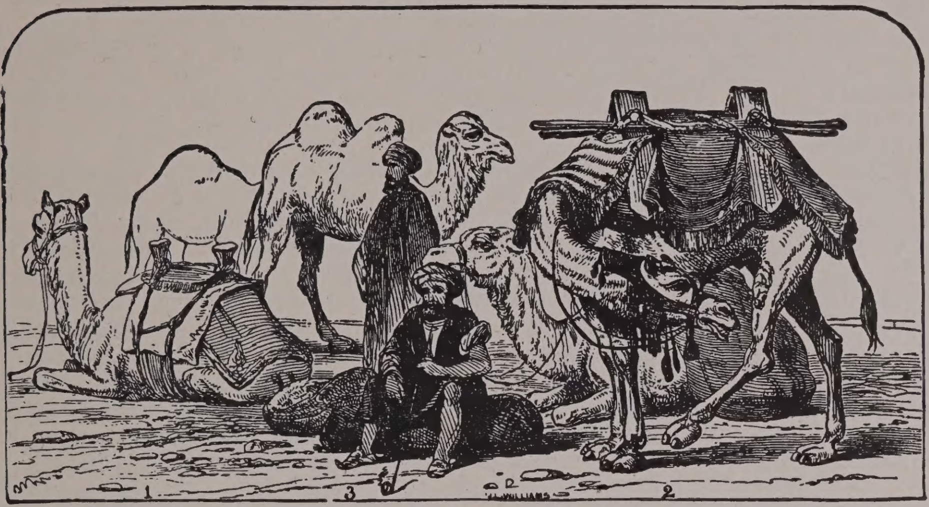
Cam'bridge, University of, an English seat of learning in the city of Cambridge, on the river Cam, 58 miles north of London. Tradition places the beginnings of the university as far back as the 7th century; but its definite history begins in the 12th century. Like Oxford, it differs in many ways from the universities of the European continent and of the United States, but especially in what is called its college-system. It is at present made up of 18 colleges, each of which has its special students, teachers and governing body, but is at the same time subject to the general laws of the university. The governing body of the university is the senate, which is made up of graduates who possess the degree of Master of Arts, which is had without examination about four years after graduation. The relation between the colleges and the university is much like that between the individual states of this country and the Union as a whole. The course in any college covers three years, during which the students are called freshmen, junior sophomores and senior sophomores. The students are also divided into four classes, each class paying a different tuition; noblemen, fellow commoners, who receive their name from the privilege of dining or "having their commons" at the table of the fellows of the university; the pensioners; and the sizars. The sizars formerly had to do all sorts of menial tasks; but this practice has ceased. While there is a rivalry between the different colleges, all unite and act as a university, and are known not as members of the different colleges, but as "Cambridge men." There are now about 126 of a teaching staff, including readers, assistants, etc., and the students number a little over 3,200. There are over 400 fellowships, the fellows being elected from those who have distinguished themselves in examinations. The university sends two members to Parliament, who are elected by the senate. Women are admitted to the examinations for honor students, and reside mostly in Newnham and Girton Colleges. There are a number of fine buildings, the chief being the senate house, the university library with over 400,000 volumes, the Pitt press, the observatory, besides the gardens and the museums. The old Gothic chapel in King's College is of remarkable beauty. Among the eminent men who have studied at Cambridge are Chaucer, Bacon, Spenser, Ben Jonson, Milton, Dryden, Newton, Pitt and Byron.

Cambyses (*kăm-bī'sēz*), king of the Medes and Persians, the son of Cyrus the Great, who became king in 529 B. C. He added Egypt to the Persian territory, but an army which he sent to take possession of the temple of Jupiter Ammon perished in the desert, and another army which he led against the Ethiopians was depleted by hunger and disease. These disasters seem to have made him a madman. He killed his brother Smerdis and one of his sisters, and treated the Egyptians with great cruelty. But a revolution arose, and one of the Magians assumed the character of the murdered Smerdis and seized the Persian throne. Cambyses marched against him from Egypt, but died on the way, in Syria, from an accidental wound in the thigh, in 522 B. C.

Cam'den, county-seat of Camden County, New Jersey, lies on the Delaware River opposite Philadelphia, with which it is connected by bridge and ferry. It is the terminus of a number of railroads, has extensive shipyards and immense market gardens. It also has foundries, cotton and woolen mills and manufactures of machinery, iron works, paints, Victrolas, foods, shoes, etc. There are many public-school buildings, a private and a public high school, hospitals, churches, etc. Camden has twelve large banks and all the adjuncts of a great city. The rapid growth of the city in recent years is shown by the increase of population from 58,813 in 1890 to 75,935 in 1900. Population, about 145,000.

Camel, a cud-chewing animal of the Old World, especially adapted by nature to travel waste deserts with scarcity of food and water. They therefore are of great use to man, both as baggage carriers and for riding. There are two kinds, the dromedary or single-humped camel of Arabia, Syria and Africa, and the Bactrian camel with two humps—native of Asia

The feet are provided with a spongy pad, that makes them well fitted to travel over the soft, yielding sand and also especially sure-footed in other localities. The hump is a special provision of nature for prolonged periods of fasting. It is only during a part of the year that the camel has abundant moist food; this is taken in greater quantities than is needed for immediate uses, and the rest is stored in the hump in the form of fat as reserve food. This is drawn on when food is scarce. The camel will pick up a living where other animals would starve, even dry twigs being chewed and turned to account as food. The walls of the stomach are provided with small pockets, in which water is stored, and they can travel several days in the hot, dusty desert without drinking. Camels are further adapted to desert travel by their nostrils, which can be tightly closed against sand storms.



1 and 2 Arabian Camels and Camel drivers. 3 Bactrian or two-humped Camel.

The average value of a baggage camel among Sudanese Arabs is about $15, but a good riding dromedary is worth from $50 to $150. The motion of the ordinary camel is said to be very trying, but that of the best riding kinds is easy and soothing. The latter are also swifter. They go, ordinarily, 50 miles a day for five days consecutively, but, when pushed, can cover more ground. The baggage camels are slower. In Africa they are expected to carry five or six hundred pounds' burden, and march 25 miles a day. It is expected that they shall be watered after four days' travel. They are not docile and patient, as those who do not know them are disposed to believe, but perverse and stupid. They will eat poison herbs and bushes, if not closely watched, and, although they kneel to be loaded, they complain and groan as the burden is laid on.

The Arabian dromedary is ten or eleven feet long and seven or eight feet high at the shoulders. It has fine, reddish-brown hair, abundant around the neck, throat, and tail, but absent on the breast and knees, where the skin is naked and provided with pads. The Bactrian camel is easily distinguished from the dromedary by its two humps. It is domesticated and also known in a wild state or, at least, wandering at liberty. It is of larger size than the dromedary, and is found in Siberia, Tibet and China. A few years before the Civil War, some camels were imported by the government of the United States for use on the great American plains. They were neglected and allowed to run free. Some remnants of this importation are now found in parts of Texas, Arizona and New Mexico. The alpaca and llama of South America belong to the same family as the camels, but differ from their Old World relatives.

Cam'elot. Tennyson in *Idylls of the King* speaks thus of Camelot:

The dim rich city, roof by roof,
Tower after tower, spire beyond spire,
By grove and garden lawn and rushing brook
Climbs to the mighty hall that Merlin built . . .
And over all one statue in the mold
Of Arthur, made by Merlin, with a crown.

Camelot is the name that the minstrels and historians of the middle ages gave to a city that was situated in Mommouthshire, Wales, on the River Usk, where there are still the ruins of a great amphitheater and of baths, pavements, etc. Geoffrey of Monmouth (about 1150) supposed that this was the place where Arthur had held his court, for the people still call the amphitheater King Arthur's Round Table. Tennyson preserves the tradition. But, as a matter of fact, it is not likely that Arthur had much, if anything, to do with this city. It is called Caerleon, which means castle of the legion, and was so-called because the Romans, finding there a small British town, made it an army post for the Second Augustan Legion. It was a considerable town in Roman days, and after the Romans had gone it was the seat of a bishopric and abbey. It is now a village with about 1,000 inhabitants.

Cam'eo, an engraved gem in which the figure or subject is carved in relief. It is distinguished from an intaglio, in which the engraved subject is sunk or hollowed out like a seal. Probably dating back to the Egyptians, the art of cameo-cutting was brought to a high state of perfection among the Greeks. The stones used by the ancient engraver were agates, with various strata, and are known as onyx stones, the different kinds of strata giving rise to special names. Alternate layers of black and white make the simple onyx; white and ruddy brown make sardonyx; and white and gray make chalcedony, etc. Frequently there are three different colored layers, or the ground may be obtained in one color, the figure in a second and wreaths or other ornaments in the third. Cameos have been used not only for ornaments, but for adorning cups, vases, etc., and cups were often worked out of a single stone, around which was engraved a series of figures. A vast number of ancient cameos have been preserved. One of the most celebrated is the Gonzaga cameo, a sardonyx of three strata, now in the imperial cabinet of St. Petersburg. It represents Nero and Agrippina. One of the largest and most famous cameos is in the National Library at Paris, which represents Augustus and the princes of the house of Tiberius as they are being numbered among the gods. It contains 20 figures. Italian cameo-cutters introduced shell-cameos. Imitation cameos are made in glass of different colors, and are called pastes.

Cam′era is an Italian word meaning room, and is etymologically the same as the English word chamber. It has come to mean, however, only a portable dark box used by photographers. The front of this box is provided with a flange, into which is screwed a lens. The rear of the camera is made to receive either a ground-glass plate or a sensitive photographic plate, upon which the lens projects the picture which is to be photographed. In a typical camera the remaining four walls are made of folded leather and are called the bellows. This enables the operator to vary the distance between the lens in front and the plate in the rear. In recent times this typical camera has undergone many modifications. Some are made to fold up, some are made without bellows, some are made so small as to be carried in the pocket, while the spectroscopist at times uses cameras made entirely of metal, and at other times he converts an entire room of his laboratory into a camera.

Camoens (*kăm′ō-ĕns*), **Luiz de,** the greatest poet of Portugal, was born at Lisbon in 1524. His chief poem, the *Lusiads*, named from the fabled hero Lusus, who, in company with Ulysses, is said to have visited Portugal, is the national epic of the Portuguese. Camoens died in poverty in a public hospital in 1580.

Camp, Walter (1859–1925). When this man, who became America's foremost advocate of clean sports, was a boy in his home town of New Haven, Connecticut, organized athletics as you know them to-day did not exist, and many persons did not know the value of proper exercise. He entered Yale in 1875, became captain of the football and baseball teams, was graduated, and studied medicine. Equipped with medical knowledge, he became athletic advisor for Yale, and worked hard to develop inter-collegiate games. His interest in health led to his plan of home exercise called "Camp's Daily Dozen." He wrote many books on sports and physical culture which are read by young as well as older people. Through his influence the value of exercise is more widely appreciated.

Camp Fire Girls, an organization among girls, somewhat similar to the Scout movement among boys. Corresponding to "Scout Masters" are "Guardians of the Fire." To secure admission or advancement a girl must, among other things, learn to prepare and serve meals, mend garments, keep accounts, average at least half an hou daily outdoor exercise, name the chief causes of infant mortality in summer and how to deal with them, know what a girl of her age needs to know about herself, understand the principles of elementary bandaging and what to do in the following emergencies: Clothing on fire, person in deep water who cannot swim, one who has fainted, and how to deal with an open cut or a frosted foot. Girls from twelve to twenty are eligible for membership. There are organizations in every state and territory. The headquarters of the organization is in New York City, and Dr. L. H. Gulick, formerly director of physical training of the New York public schools, is president.

Campagna di Roma (*căm-pän′yä*). See Rome.

Campania (*kăm-pän′ēä*) (Latin *Campus*, a plain), a volcanic but otherwise attractive district in Italy lying inland from the Tyrrhenian Sea, in the region of Naples, and covering an area of 6,289 square miles, with a population, by the latest census, of 3,347,925. It was a province of ancient Italy, and today it embraces the districts of Caserto, Benevento, Napoli, Avellino and Salerno, extending from the region of the Volurno River on the north to the Gulf of Policastro on the south. The province, originally settled by people of Oscan race, was subsequently under Greek and Etruscan dominion, until it was overrun, in 340 B. C., by the Romans who called it *Campania Felix* (Happy Campania), in allusion to its great fertility and delightful climate and scenery, in spite of its ill-omened volcanic character and its stretches of sulphur fields. Mount Vesuvius, overlooking the beautiful Bay of Naples, is its most striking physical feature; while anciently it embraced Herculaneum and the gloomy Lake Avernus, the entrance, as the Romans averred, to the infernal regions. The province was in the classic period traversed by the Appian Way. The chief towns of the district are Naples, Salerno, Capua, Avellino, Benevento and Caserta. After Sulla's day the coast towns of Campania were much frequented by the *literati* and wealthy sybarites of ancient Rome. See CAMPAGNA DI ROMA (plain of Rome), under ROME.

Campbell (*kăm'bel*), **Alexander,** an American theologian, was born at Shane's Castle, Ireland, in June, 1788. After attending Glasgow University, he came to the United States and served as pastor of a Presbyterian church in Washington County, Pa. Later he became a Baptist, and as early as 1810 he adopted the Bible as the sole recognized creed of his church. But it was not till 1827 that he founded the Disciples of Christ, a church that grew rapidly and now has a large membership in America and foreign countries. His followers are also known as Christians, Church of Christ and Campbellites. In 1841 Mr. Campbell founded and became the first president of Bethany College, at Bethany, W. Va., which has 280 students. Besides his work as pastor and teacher, he founded and edited the denominational organ of his church. He died March 4, 1866.

Campbell-Bannerman, Right Hon. Sir Henry, G.C.B., M.P., head of the Liberal ministry in the British Parliament, was born in Scotland in 1836, and educated at Glasgow and Cambridge. He entered Parliament in 1868, and served for a time as financial secretary at the war office, and in Mr. Gladstone's administration was chief secretary for Ireland and secretary of state for war. In 1894–95 he filled the latter post, also, under Lord Rosebery; and in February, 1898, on the retirement of Sir Wm. Vernon Harcourt as leader of the Liberal party in the house of commons, Sir Henry was chosen to succeed him. In Dec. 1905, he became Liberal Prime Minister. His death occurred April 22, 1908.

Campbell, Thomas (born 1777, died 1844), a noted British poet, was born at Glasgow, and, as a student at the university there, was distinguished for his knowledge of Greek literature. His early poem, *The Pleasures of Hope*, gave him a name as a poet. He traveled on the continent, where he witnessed the battle of Hohenlinden, which forms the subject of one of his finest lyrics. He wrote, besides poems, articles for the magazines and papers and for the *Edinburgh Encyclopædia*, and also published a magazine. He was at one time lord rector of the University of Glasgow. He died at Boulogne, France, and was buried in Westminster Abbey, a Polish nobleman scattering dust on his coffin from the grave of Kosciusko. *Gertrude of Wyoming* and the short poem, *The Last Man*, are well known; but it is for his war lyrics that Campbell will be most remembered, such as *Hohenlinden*, *Ye Mariners of England* and *The Battle of the Baltic.*

Canada. Canada comprises the northern half of North America. Its southern boundary is the United States, on the east is the Atlantic, on the west the Pacific and on the north the Arctic Ocean. Its area is three and a half millions of square miles, about the same as that of the United States and nearly equal to that of Europe. The population is over ten millions or nearly one-quarter less than that of Belgium. From Halifax on the Atlantic to Vancouver on the Pacific is 3,740 miles by rail. From Victoria on the Pacific to Dawson on the Yukon River is 1,550 miles by ocean and river steamer and rail. From Fort William at the head of Canadian navigation on Lake Superior, by the water way of the Great Lakes and the St. Lawrence River, to the tidal seaport of Quebec is 1,400 miles, and from Quebec city to the extreme Atlantic coast, at the Straits of Belle Isle, is 850 miles. Its most southerly portion is in the latitude of northern Spain and Italy, and the most northerly portion is in the latitude of northern Norway.

Older and Newer Canada. The eastern and older part of Canada occupies chiefly a vast peninsula lying between the water-system of the St. Lawrence on the south and the Hudson Bay on the north. This peninsula is of very irregular shape, and is 2,200 miles in length from east to west, with a breadth of from 300 to 1,200 miles. The western or newer, and much the larger, portion of Canada is compact in form. It extends from the western end of the Great Lakes and the west shore of Hudson Bay to the Pacific Ocean, a distance of 1,500 miles, and from the United States boundary (the 49th parallel of latitude) to the Arctic Ocean, a distance of 1,600 miles.

The provinces and territories of Canada may be grouped as maritime, eastern, central, western and northern. Maritime: British Columbia, Nova Scotia, New Brunswick and Prince Edward Island. The easterly portion of the province of Quebec on the shores of the Gulf of St. Lawrence may be included as a part of maritime Canada. The eastern provinces are Ontario and Quebec, which lie along the St. Lawrence River and its Great Lakes, and extend along Hudson Bay as shown on accompanying map. The central provinces are Manitoba, Saskatchewan and Alberta, which occupy the prairie area lying between the wooded region of eastern Canada and the Rocky Mountains. The western or Pacific province is British Columbia, which lies between the Rocky Mountains and the Pacific Coast. Northern Canada is the territory lying between the northern limits of the eastern, central and western provinces, already mentioned, and the Arctic Ocean.

West of the Rocky Mountains is Yukon Territory. In the redivision of Canadian territory (1912), Franklin, Mackenzie, and a portion of Keewatin were added to Northwest Territories, Ungava to Quebec and a portion of Keewatin to Ontario and Manitoba.

Climate. The vast extent of Canada necessarily involves a wide range of climatic conditions. Except on and near the ocean coasts, the general characteristic of the climate of Canada as compared with that of Europe is that the summer is shorter, warmer, and has less moisture, and the winter longer and somewhat colder than in corresponding European latitudes. It is bracing and healthy, and in all respects suited to the fullest development of the races of the British Isles and northwestern Europe generally.

On the Pacific coast, owing to the Japanese current, the climate is identical in temperature with that of the British Isles, which lie in the same latitude. The influence of this warm current on the Pacific coast extends eastward across the western and into the central provinces, so that the winter climate of the western part of the central provinces is considerably milder than that of the eastern part. On the Atlantic coast, and inland, the climate is colder than in corresponding latitudes of Europe, because of the Arctic current which flows southward along the coast.

Surface. The important physical features of Canada are its mountains, lakes, rivers, forests and prairies and the great inland sea of Hudson Bay. The Rocky Mountains extend from the United States boundary northward to the Arctic Ocean. They bound the central plains on the west, and are the highest of the several parallel mountain ranges of the western province. They contain immense deposits, and in the parallel ranges between the Rockies and the Pacific coast are to be found the precious metals in great abundance, especially gold. The Laurentian Range of hills extends from the Atlantic coast, at the Strait of Belle Isle, westerly and northerly, a distance of 2,300 miles, to the east end of Great Bear Lake near the Arctic coast. In the east the Laurentian Range divides the waters flowing south into the St. Lawrence from those flowing north into Hudson Bay, and in the northwest it divides those flowing westward into Mackenzie River from those flowing eastward into Hudson Bay. But midway between the St. Lawrence and Mackenzie water-systems, the joint waters of the Red and Saskatchewan Rivers break northward through the Laurentian Range by way of Nelson River into Hudson Bay. The Laurentian Range carries iron in great abundance, but no coal. Silver, nickel, cobalt and many other valuable metals are also found, although the region has as yet been very little explored.

Drainage. The Laurentian district is remarkable for its numerous lakes, and especially for the succession of great lakes, which, forming part of three separate river systems, lie almost continuously along its southern side all the way from the Atlantic to the Arctic. The many streams and rivers which have their origin in the Laurentian Range afford unlimited opportunities for the creation of water power, and more than replace the lack of coal for all purposes for which power is required. The St. Lawrence and its tributary, the Ottawa, are the great rivers of eastern Canada; the Red and Saskatchewan of central Canada; the Fraser and Columbia of western Canada; and the Mackenzie and the Yukon of northern Canada. The St. Lawrence, Mackenzie and Yukon are among the largest rivers in the world.

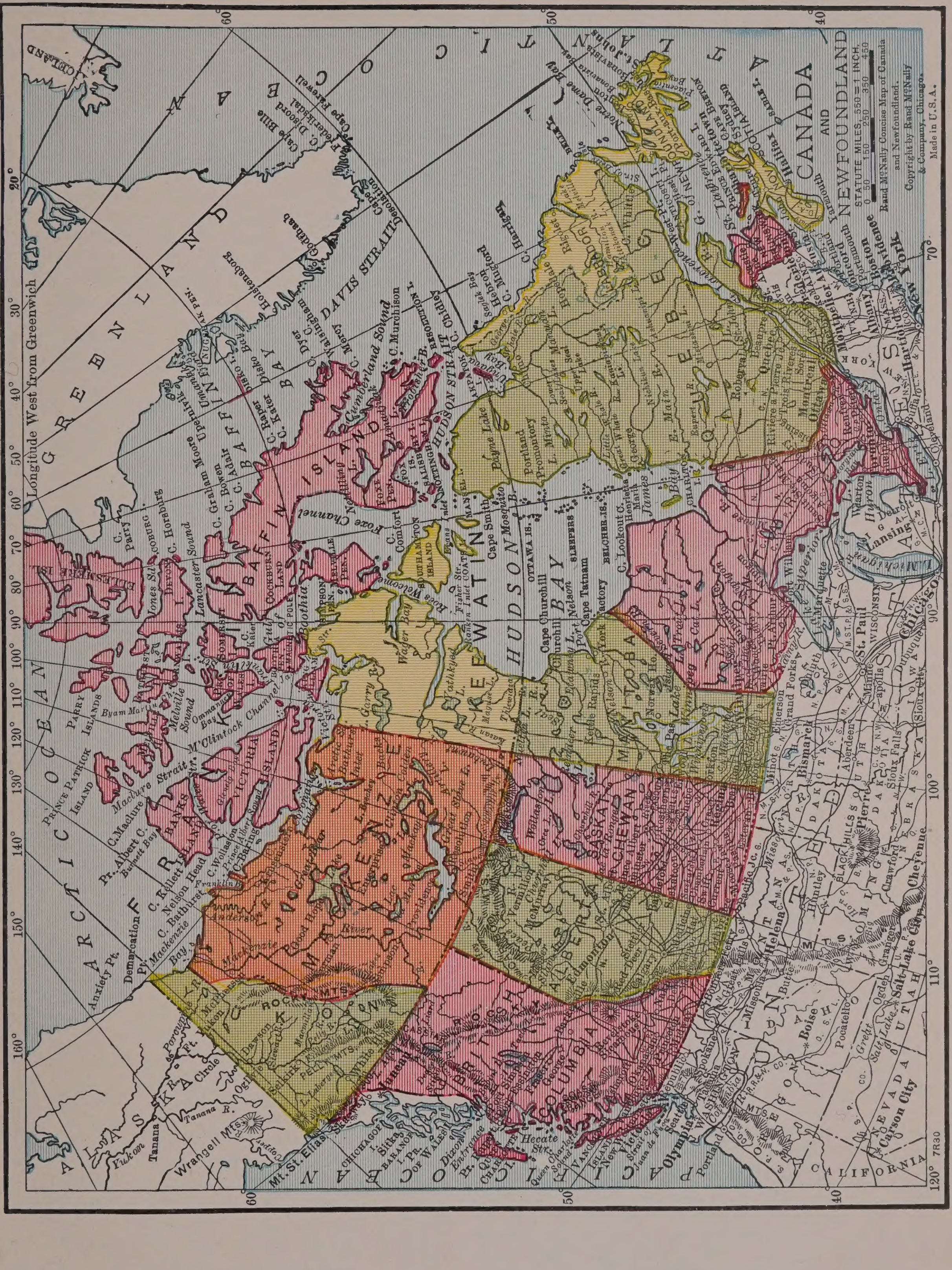
The forests of Canada are one of the greatest sources of the national wealth. Maritime, eastern and western Canada were entirely covered by forest, of which only a small proportion has as yet been displaced by settlement and cultivation. The northern part of central Canada is also very considerably forested.

The prairies, which comprise the southerly portion of the central provinces, lie in an irregular triangle formed by the 29th parallel and the United States boundary on the south; the Rockies on the west; and the Laurentian Range on the northwest. They are watered in the southeastern part by the Red River, in the south and west by the Saskatchewan, and in the northwest by the Athabasca and Peace Rivers, branches of the Mackenzie.

Manufacturing and Commerce. With her vast mineral, fish, timber and other resources Canada is destined to become a great industrial and commercial country. During the last ten years the growth of her manufactures has been marvellous. The record of foreign commerce for the past few years shows that Canada's foreign trade is increasing more rapidly, proportionately, than that of any other country. The rate of gain for a period of ten years has been 132 per cent. The total of Canada's exports is over $390,000,000, of which the amount to Great Britain is $180,000,000 and that to the United States $167,000,000. Total annual imports, $690,000,000. From the United States come $455,000,000 and from Great Britain $139,000,000. Much of the Canadian wheat is shipped direct to Europe. The value of the wheat exported is over $88,000,000; of flour $20,000,000; of cheese $21,000,000; and of pork, bacon and ham $6,000,000.

The total value of lumber exports annually is over $33,000,000, much of it going to Great Britain. Thirty-five mills are converting spruce into wood-pulp.

Minerals. British Columbia and Nova-


CANADA
AND
NEWFOUNDLAND
STATUTE MILES, 550 = 1 INCH.
0 50 150 250 350 450
Rand McNally Concise Map of Canada and Newfoundland.
Copyright by Rand McNally & Company, Chicago.
Made in U.S.A.
Longitude West from Greenwich
GREENLAND
ARCTIC OCEAN
ATLANTIC OCEAN
PACIFIC OCEAN
HUDSON BAY
BAFFIN BAY
DAVIS STRAIT
HUDSON STRAIT
BAFFIN ISLAND
FRANKLIN
MACKENZIE
YUKON
KEEWATIN
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
MANITOBA
ONTARIO
QUEBEC
NEWFOUNDLAND
ALASKA
UNITED STATES
7R30

Scotia are the chief mining provinces. Important mineral deposits are found also in Ontario and Quebec. Extensive coal areas have been found in western Canada, and new railways are continually opening additional territory.

Canada's total mineral production annually aggregates in value $135,000,000. The value of the coal is about $36,000,000, of gold $12,000,000 and of silver $19,000,000.

The Vancouver Island (British Columbia) mines produce a coal of excellent quality. The coal deposits of Nova Scotia underlie an area of about 635 square miles. The chief workings are in the Sydney, Pictou and Cumberland fields. The Nova Scotia mines are the largest producers in Canada.

At Lethbridge, a town of 8,000 people, a mine has been opened on a large seam of bituminous coal, the output of which has been traced for many miles. The Estevan mines (in the Souris fields) and the Lethbridge mines supply the provinces of Manitoba and Saskatchewan. The coal-beds extend far down the Saskatchewan and northward into the valley of Peace River. It is no uncommon thing in this district to see the agricultural settler driving up to the pit's mouth for his household supply of coal. easily obtained at prices ranging from $1.00 to $2.00 per ton.

In Nova Scotia iron is found near the coal, thus permitting economical smelting. Large areas of iron-ore have been found north of Lake Superior in Ontario, in eastern Ontario, in Quebec and in Ungava. Large steel-works have been established at Sydney and Terrona, Nova Scotia, and at Sault Ste. Marie, Ontario. There are iron smelters at Rawdon (Quebec) and at Deseronto, Hamilton and Midland (Ontario). Nickel ores are of great and growing importance, particularly as there are only two producing localities of consequence in the world—the Sudbury district in Ontario and the French colony of New Caledonia. The Ontario mines contain enough ore to supply the needs of the world for all time. Most of the copper output of Ontario is produced as a by-product of nickel. In 1902 British Columbia produces annually about 30,000,000 pounds of copper, most of which is mined in the west of the Kootenay district.

Practically all of the first-quality asbestos that is marketed in the world is produced at the Thedford, Black Lake and Danville mines in southeastern Quebec. Large quantities of mica are mined in Quebec and Ontario. The Yukon placer gold-mines are producing more gold than any other placer mines in the world, and since the wonderful Klondike rush in 1897, when 60,000 people sought this far-away northern country, gold to the value of $100,000,000 has been taken out. One of the richest silver camps in the world is at Cobalt, Ontario. See YUKON and COBALT.

Fisheries. Canada has become the fishing ground of North America. On the Atlantic and Pacific are extensive fisheries, while countless lakes, with their tributary streams, teem with fish of the greatest value as food.

Hundreds of foreign vessels, including many from the United States, come to the Canadian waters to share in these treasures. It is estimated that 78,000 Canadian fishermen thus find employment. Their boats, nets and gear are valued at $11,500,000 and their annual catch at $29,629,000. There are, moreover, extensive waters yet unfished, which in the near future will add to the value of the catch.

The vast salmon industries on the Pacific coast are in some respects the most remarkable in the world. In the season when fish are running up stream, the flow of water actually is impeded in shallow places by their numbers. Standing on the bank. one sees the whole river red with the gleam of their sides. Canning factories are built on these streams, and each year 9,000,000 to 10,000,000 fish are canned.

Hudson Bay and the coast waters from the Ungava to Mackenzie River are the richest whaling grounds in the world. The walrus and many valuable fish, such as sea-trout, salmon and cod, are found in these waters.

The Department of Marine and Fisheries carries on fish-culture, introducing fish into new waters and preventing the exhaustion of the present supply. There are a number of government-hatcheries, which in some years distribute over 400,000,000 small fish.

Railways. In proportion to the population, Canada has more railway mileage than any other country in the world, approximately 41,410 miles. About one-third of this total is included in the Canadian Pacific Railway, while the balance, except for some minor lines in the West, forms the Canadian National Railways. See CANADIAN PACIFIC; CANADIAN NATIONAL.

Water Transportation. There are several trans-Atlantic steamship lines which are owned by Canadian interests; especially well known is the Canadian Pacific. Canadian Pacific steamers also ply to China, Japan and Australia.

The magnificent St. Lawrence River is one of the world's greatest waterways. Canals have been built wherever the rapids obstruct navigation. On the Welland Canal alone, Canada has spent some $120,000,000. The result is a ship canal which is 27.7 miles long, twenty-five feet deep, and 200 feet wide at the bottom.

The St. Lawrence has been so deepened as to allow the largest ocean steamers to come up to Montreal. Above Montreal, vessels of fourteen-feet draught can ascend to Lake Erie, and from Lake Erie to Lake Superior twenty feet of water are available. A treaty has been negotiated between the Dominion and the United States, under which the St.

Lawrence will be widened and deepened for the largest vessels. Ratification of this treaty was expected in 1934.

Water Power. The vast amounts of potential water power, which Canada possesses, are sure to play an important part in the country's industrial development. Many industries are already supplied with hydro-electric power. It has been well said that the Laurentian Highland constitutes "a gathering ground for many large and almost innumerable small rivers and streams which, in the sources of power they offer in their descent to the lower adjacent levels, are likely to prove of greater and more permanent value to the industries of the country than an extensive coal field."

At Sault Ste. Marie, one of the largest pulp-mills in Canada is operated by electricity locally developed. Here some 175,000 horse power has been developed. On the Canadian side of Niagara Falls (which see) some 950,000 horse power is now developed. Here is situated the Queenstown-Chippewa power plant, which produces 550,000 horse power, the largest single hydro-electric development in the world. Toronto and many other cities are supplied with electricity from Niagara Falls. It has been estimated that within fifty miles of Ottawa there is a potential supply of hydro-electric energy of not less than 900,000 horse power. The total energy of Niagara Falls is estimated to be 7,500,000 horse power.

Schools. The provinces control the schools, and each of them as to system, methods and equipment is generally working out its own ideal. The Royal Military College at Kingston is a Dominion institution. All the other institutions of higher learning are provincial or controlled by local corporations. There are twenty-three universities and eighty-eight colleges in the Dominion. Some fifty of the colleges, most of them being classical colleges or seminaries, are situated in the Province of Quebec. Six of the universities, those of New Brunswick, Toronto, Manitoba, Saskatchewan, Alberta and British Columbia, are controlled by the province in which each is situated. Dalhousie, McGill, Queens, and Western universities are undenominational. The remainder are denominational. The elementary schools (public schools or common schools) are free throughout the Dominion. Every province makes ample provision for their upkeep.

Population. Canada is comparatively a new country. Much of its increase in population has been due to immigration. The opening of the Canadian Pacific Railway in 1897 brought a great influx of new settlers especially to the Northwest. In 1896 immigration had reached its lowest annual figure, about 16,000, but beginning in 1902 it reached new heights. A maximum was reached in 1913 with a total of 492,432 immigrants, some 150,000 coming from the United Kingdom and about 139,000 from the United States. There was little immigration during the World War except from the United States, but thereafter it began again. After the general election of 1930, all immigration was prohibited because of the economic depression and unemployment situation.

In recent years there has been a sharp trend of population from east to west. The eastern provinces still remain the most densely populated, however. The variation of population in the provinces is given in the following table:

Province	1901	1921	1931
Prince Edward Island	103,259	88,615	88,038
Nova Scotia	459,574	523,837	512,846
New Brunswick	331,120	387,876	408,219
Quebec	1,648,898	2,361,199	2,874,255
Ontario	2,182,947	2,993,362	3,431,683
Manitoba	255,211	610,118	700,139
Saskatchewan	91,279	757,510	921,785
Alberta	73,022	588,454	731,605
British Columbia	178,657	524,582	694,263
Yukon Territory	27,219	4,157	4,230
Northwest Territories	20,129	7,988	7,133
Royal Navy	......	485	....
Total	5,371,315	8,788,483	10,374,196

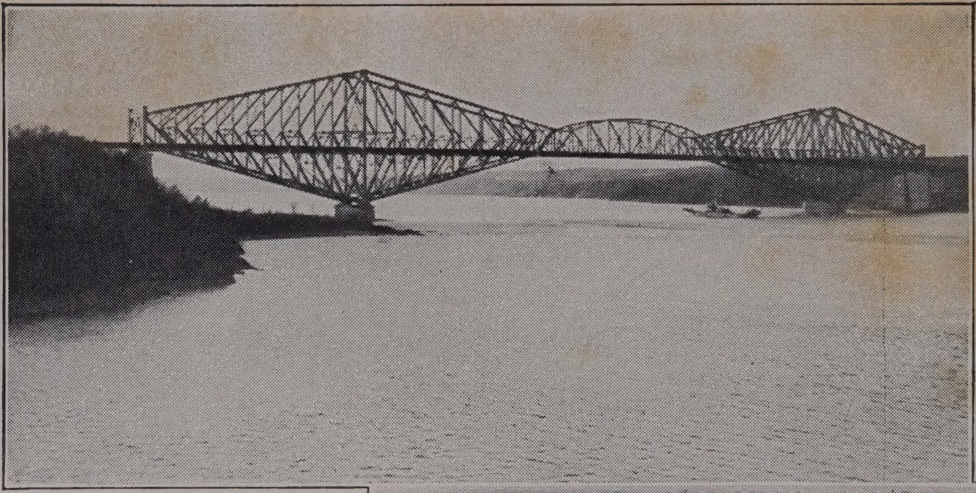
The twenty-five largest cities in Canada, with their populations in 1931, are:

	City	Province	Population
1.	Montreal	Quebec	818,577
2.	Toronto	Ontario	631,207
3.	Vancouver	British Columbia	246,593
4.	Winnipeg	Manitoba	218,785
5.	Hamilton	Ontario	155,547
6.	Quebec	Quebec	130,594
7.	Ottawa	Ontario	126,872
8.	Calgary	Alberta	83,761
9.	Edmonton	Alberta	79,197
10.	London	Ontario	71,148
11.	Windsor	Ontario	63,108
12.	Verdun	Quebec	60,745
13.	Halifax	Nova Scotia	59,275
14.	Regina	Saskatchewan	53,209
15.	St. John	New Brunswick	47,514
16.	Saskatoon	Saskatchewan	43,291
17.	Victoria	British Columbia	39,082
18.	Three Rivers	Quebec	35,450
19.	Kitchener	Ontario	30,793
20.	Brantford	Ontario	30,107
21.	Hull	Quebec	29,433
22.	Sherbrooke	Quebec	28,933
23.	Outremont	Quebec	28,641
24.	Westmont	Quebec	24,235
25.	Kingston	Ontario	23,439

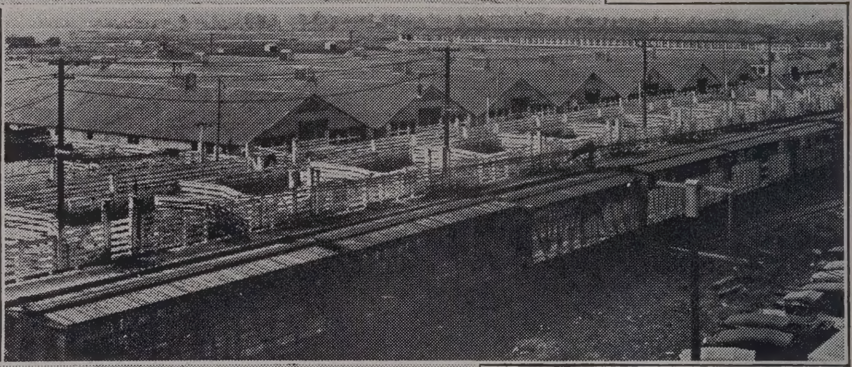
History. The territories which now constitute the Dominion of Canada came under the British flag at various times, some by settlement and others by conquest or cession. Nova Scotia (Acadia) was discovered by the Cabots, in the service of King Henry VII, in 1497. The colony of Halifax was founded in 1749. By the Treaty of Utrecht (1713) Acadia and the Hudson Bay Territory were acknowledged to be British territory. The Hudson Bay Company's charter, conferring right of government over the territory now known as the provinces of Manitoba, Saskatchewan, Alberta and the Northwest Territories, was granted in 1670. The old French colony of Canada was surrendered by the capitulation of Montreal, signed September 8, 1760, and with Prince Edward Island and part of the present province of New Brunswick, was formally ceded to Great Britain by

BOW RIVER VALLEY, ALBERTA, CAN., ON CANADIAN PACIFIC RAILWAY

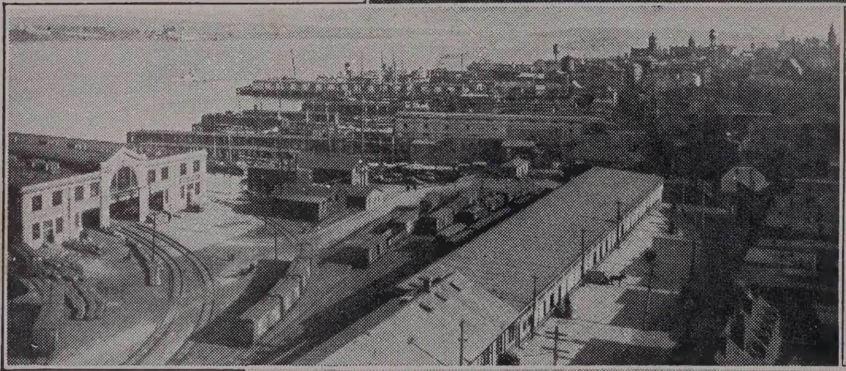
CANADIAN SCENES OF TODAY



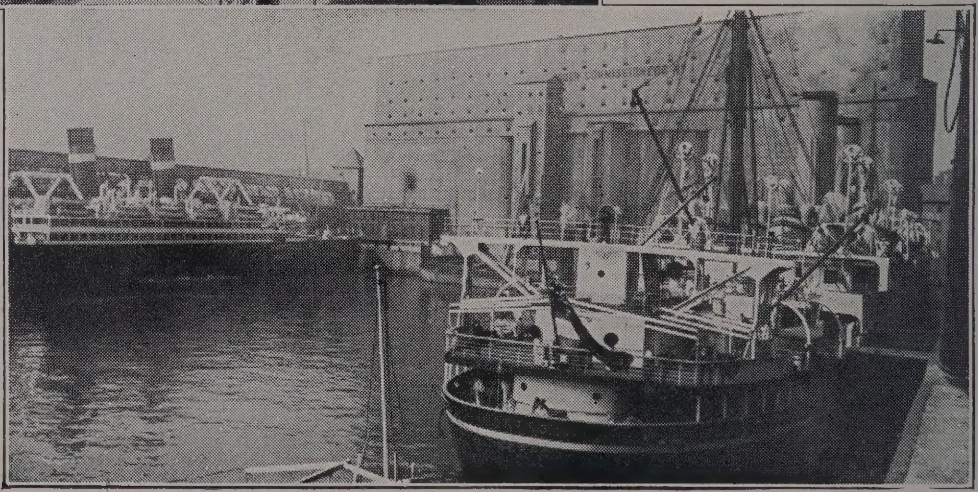
The span of this cantilever bridge across the St. Lawrence at Quebec is the longest of its kind in the world.



A close-up of the stock-yards at Winnipeg—great prairie metropolis.



View of the constantly expanding port facilities of Halifax, a city fast becoming an important steel and maritime trade center.



Montreal Harbor; ocean vessels dock here constantly at this great inland harbor of the St. Lawrence.

©Ewing Galloway

France under the Treaty of Paris, signed Feb. 10, 1763. Vancouver Island was acknowledged to be British by the Oregon-Boundary Treaty of 1846, and British Columbia was occupied in 1858.

As originally constituted, the Dominion of Canada was composed of the provinces of Ontario, Quebec, Nova Scotia and New Brunswick. They were united under the provisions of an act of the imperial Parliament passed in 1867 and commonly cited as The British North America Act 1867. Provision was made in the act for the admission of British Columbia, Prince Edward Island, the Northwest Territories and Newfoundland into the Dominion. Newfoundland alone has not availed itself of such provision. In 1869 the extensive region known as Rupert's Land, the Hudson Bay Territory and the Northwest Territories was added to the Dominion by purchase from the Hudson Bay Company. The province of Manitoba was set apart out of a portion of it, and admitted into the Confederation on July 15, 1870. On July 20, 1871, the province of British Columbia and on July 1, 1873, the province of Prince Edward Island, respectively, entered the Confederation. The provinces of Alberta and Saskatchewan were formed from the provisional districts of Alberta, Athabaska, Assiniboia and Saskatchewan, and were admitted to the Union as provinces on September 1, 1905.

The Dominion adopted the same form of government as existed in the mother-land. There are a governor-general appointed by the king to represent him, two houses of parliament and a cabinet. As each province has a legislature of its own to manage its local affairs, it is as if England, Scotland, Wales and Ireland had separate parliaments in addition to that at Westminster. Canada has thus become really a daughter-nation of Great Britain. The mother-land leaves her practically free to manage her affairs.

Canadian National Railways. Canada wishes to grow; and in order to assist the development of the west and the north, the government decided to extend railway facilities to many out-lying regions. Private railway companies would not do this, because the trackage in the undeveloped regions would not pay for itself. So the government took over the Grand Trunk Railway System, the Canadian Northern Railway, the Transcontinental Railway, the Grand Trunk Pacific Railway, and the Intercolonial Railway. These were merged into one system and the lines of track extended.

To-day the Canadian National Railways operate about 23,000 miles of track—more than 50 per cent. of the entire trackage in the Dominion. The organization commenced in 1922, and though the system is run at a loss, the value to Canada for developmental purposes is great. The company maintains its own telegraph system, uniting every important city and town in the Dominion; it also runs the Canadian Government Merchant Marine, comprising a fleet of some 60 vessels engaged in international trade. When Canada has reached a population of 25,000,000, the railway system will no longer run at a loss.

Canadian Pacific Railway, The, crosses Canada from east to west. Its completion saw the beginning of the real development of Canada. It enabled those who lived in eastern Canada to realize that our western prairies and unexplored northwest comprise a rich tract of about 600,000 square miles. The train of inflowing settlement after 1900 became a rush and each year thousands of well-to-do immigrants from all lands reach this great fertile country *via* the C. P. R. Along its main line are rapidly growing cities, and its branch lines are bordered with thrifty and growing settlements. In three provinces alone crossed by this road, viz., Manitoba, Alberta and Saskatchewan, the population grew from 420,000 in 1901 to over 1,300,000 in 1911. The railway management is enterprising and progressive. Some years ago its directors decided to undertake the irrigation of a tract 30,000,000 acres in extent, 40 miles wide and extending 150 miles east of Calgary (Alberta). The railway thus helped Canadian expansion, and likewise was the railway benefited by the increased freight.

Along the main line of this road we reach North Bay, Port Arthur, Fort William, Kenora, Winnipeg, Brandon, Portage La Prairie, Banff, Regina, Kamloops, Medicine Hat and Vancouver and other well-known prosperous places in the development of which the war has been an important factor.

The Canadian Pacific also has a magnificent steamship service on both oceans (Atlantic and Pacific). Its steamships on the Montreal-Liverpool route are palatial. It furnishes a highway round the world.

It has a coast fleet including 15 vessels plying between coast points from Victoria, Vancouver, Seattle, Nanaimo, Ladysmith, Crofton and Comox to northern British Columbia and Alaskan ports. Its royal-mail "Empress" liners make regular trips from British Columbia to China and Japan, and its Canadian-Australian boats serve Hawaii, Fiji, New Zealand and Australia.

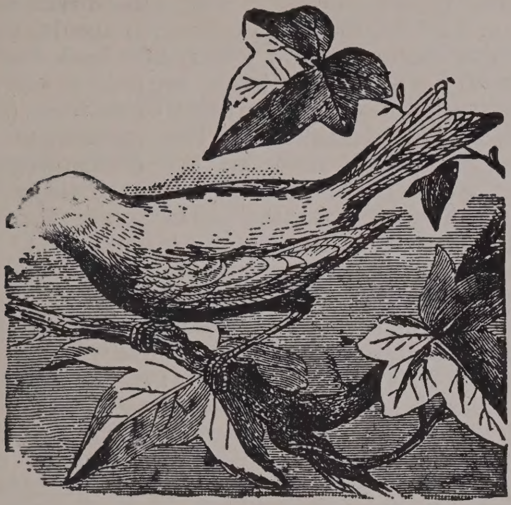
Canal, an artificial water-course. Canals are used principally for navigation, but also for drainage, for irrigation and for supplying cities and towns with water.

Navigation canals are of two kinds: (a) ordinary canals which are only a few feet deep and are traversed principally by special canal boats and barges, and (b) ship canals which admit sea-going vessels. A canal must be built in a series of level stretches. Where a change of level is made, the boats are generally raised by means of locks, but sometimes by lifts and cars. Canals for inland navigation have been used for many centuries. The Grand Canal of China was built in the 8th century, is 650 miles long and is still in use. Canal systems in Europe are very extensive. In Russia the system of canals was started by Peter the Great, and St. Petersburg is connected with the Caspian and Black Seas. Sweden has 800 miles of canals. Both Germany and Austria have their principal rivers connected by canals, and Austria has recently planned a large increase of its canals. The canals of Holland are almost the roads of the country. In Great Britain there are about 5,000 miles of navigable canals, so that every town in the island is within a few miles of navigable water. The first canal in the United States was built in 1793 around the falls of the Connecticut River at South Hadley, Mass. In the early part of the 19th century a very extended system of canals was planned, but of the 5,000 miles planned, less than 3,000 miles were constructed, and many of these have since been abandoned. This is due to the building of railroads and the great reduction in the cost of overland transportation in recent years, owing to improvements in railroad service. Most engineers are agreed that the ordinary canal can never be made to compete with the railroads in the United States. Now, however, the tremendous growth of the country's commerce has made it absolutely indispensable to improve all our waterways and make new canals. The railroads cannot carry the freight. An unofficial inland waterways commission appointed by the government in March, 1907, has made a careful study of the rivers and canals of the whole country. In May, 1908, the governors of all the states in the Union, together with private delegates from every state, conferred on the subject at Washington with the national government, and Congress is considering a bill to create an official inland waterways commission. Several of the canals built in the early part of the century are noteworthy on account of the effect they have had on trade relations. The principal of these canals is the Erie Canal, built by the state of New York and opened in 1825. It extends from Buffalo to Albany, connecting Lake Erie with Hudson River, a distance of 352 miles. Originally it was but four feet deep, but the canal system of the state has been extensively improved and the old Erie Canal is now a part of the waterway unofficially known as the "Barge Canal," which accommodates boats of 12-foot draft. Other notable canals are the Chesapeake and Delaware Canal (1824-29) and the Delaware and Raritan Canal (1831-34), which connect the cities of New York, Philadelphia and Baltimore.

Ship-canals are built to connect two bodies of water so as to shorten routes. The most notable of these canals is the Suez Canal connecting the Mediterranean and Red Seas. It was opened in 1869 and reduced the distance of water transportation between Europe and India from over 11,000 miles to about 7,500 miles, and caused a saving of 36 days in the journey. The canal is about 100 miles long, and had originally a depth of 26 feet and a width at bottom of 72 feet. The depth has been increased to 28 feet and the width to over 200 feet, so as to accommodate the enormous traffic. The total cost of the canal, including the approaches at both ends, is said to have been $100,000,000. Other notable ship canals are the Caledonian Canal (a minor ship canal), the Corinth Canal, the Kiel Canal, opened in 1895, 63⅓ miles long and connecting the Baltic and North Seas, the Manchester Ship Canal, the Panama Canal (q. v.), opened for traffic Aug. 15, 1914, to connect the Atlantic and Pacific and the Welland, Huron and "Soo" Canals, the last of which has more traffic in seven months than the Suez Canal in a year.

Drainage-canals are for the purpose of carrying off the sewerage of cities. The most notable of these canals is the Chicago drainage canal connecting the Chicago River with the Illinois River by the way of the Desplaines River. The current in the Chicago River is thus turned backward and 300,000 cubic feet per minute are thus taken from Lake Michigan and reach finally the Mississippi River instead of the St. Lawrence. The cost of the work has been over $63,000,000, and owing to the effect of the current on navigation in the Chicago River, a large additional sum will have to be expended to enlarge the river channel to provide an additional inlet. It has been in the plans of the construction of this canal to make it a ship-canal, so as to connect Chicago with the Gulf of Mexico for large vessels, and as engineers who have studied the problems and prepared plans pronounce the project feasible, and the entire country is entering on an era of building canals and improving waterways, it is not improbable that this will be done.

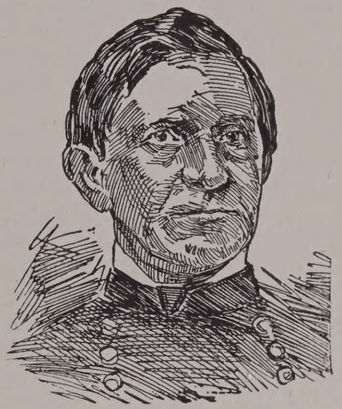
Canary Bird, the most common yellow cage-bird, highly prized as a singer. It is one of the finches. and is a native of the Canary, Madeira and Cape Verd Islands in the wild state its plumage is gray or greenish yellow tinged with brown. The yellow color of tame birds is produced by special breeding. Mama Canary builds the nest and hatches the babies. Papa Canary does most of the work of feeding them. (Watch canaries; also robins and other wild birds.) Its powers of imitation are great, and it may be taught various notes and simple airs. Exceptionally good singers are kept by the trainers as instructors for the young ones. The breeding and training of this familiar bird of the household are carried on extensively in the Harz Mountains in Germany, and also in northern England, Scotland and Belgium. The Harz canaries are famous songsters; the Saint Andreasberg birds are the most choice of all the canaries.



THE CANARY

Cana'ry Islands, a group of islands which form a province of Spain in the Atlantic Ocean, off the northwest coast of Africa. The group (usually called the Canaries) consists of seven large and several small islets, with a joint area of 2,807 square miles—less than a fourth of Maryland—with a population of 419,809. Lanzarote, Fuerte-Ventura, Gran Canaria, Teneriffe, Gomera, Palma and Hierro are the main islands. The distance from the nearest one, Fuerte-Ventura, to the African coast is about 62½ miles. The coasts are steep and rocky, and mountains are scattered over the islands, the highest being the famous peak of Teneriffe, about 12,182 feet in height. Cones, craters, beds of pumice and streams of lava show that all the islands are volcanic, though eruptions have been known in history in only three of them. There are no rivers, and on several of the islands water, which is supplied by springs, is very scarce. Over 900 species of wild flowering plants have been found on these islands, of which 420 are peculiar to the group. The lower lands produce sweet potatoes, bananas and other native plants of hot climates, while above, to the height of about 3,000 feet, the vine and various grains are raised. Some of the towns are becoming resorts for invalids, and the whole group of islands is being opened up. Harbors are being built, where many steamers touch, and telegraph cables connect the islands with Europe and Africa. The Canaries are believed to have been the Fortunate Islands of the ancients. The Greeks and Romans knew their position; but for many centuries they were lost sight of, until in 1334 they were rediscovered by a French vessel which was driven among them by a storm. They were occupied by Spain about the opening of the 15th century, and have been her possession ever since. The natural products of the islands are wine, sugar, vegetables and cochineal. The capital is Santa Cruz de Santiago, a seaport on the island of Teneriffe; population (1900), 38,419.

Canby, Edward Richard Sprigg, an American general, was born in Kentucky, in 1819. A graduate of West Point, he served in the Florida War, where he was twice brevetted for gallantry. At the outbreak of the Civil War, he was stationed at Fort Craig in New Mexico, where he displayed ability and energy in defending the fort against the Texan troops. He fought the battles of Valverde and Peralta, and was made brigadier-general. After service in the war department and in putting down the draft riots in New York, he was made major-general and became commander of the armies west of the Mississippi. In 1865 he captured Mobile. After the close of the war he held several important and onerous positions, and in 1869 took command of the department of the Columbia on the Pacific coast. While holding a parley with the Modoc Indians, who were giving trouble, he was treacherously shot by a chief called Captain Jack, April 11, 1873.



GENERAL CANBY

Cancer, a popular term describing several kinds of malignant tumors. In general they appear as a fibrous growth, spreading through surrounding tissue by means of the veins. The disease is generally caused by continued irritation of the cells, but may occur after a single accident. Cancers are most likely to appear in the stomach and intestines. On the outside of the body, they are more likely to occur at the orifices. They are a very frequent cause of death among persons over forty years of age. It is very necessary to treat the infected area at the earliest stage possible. Later on, surgery, radium, and the X-rays have been proved beneficial in sustaining life. Barnard and Gye discovered the active cancer virus in 1925.

Cankerworm, commonly known as inch or measuring worm, sometimes called fireworm, is a caterpillar, that is very destructive to fruit and shade trees. An army will devastate a large grove in a few days, sweeping over a locality like fire and leaving ruin behind. It was to arrest their work that the English sparrow was brought into the country — with the unfortunate result familiar to all. There are two species: the fall cankerworm (*Anisopteryx*) and the spring cankerworm (*Paleacrita*, or *A. vernata*). The fall species lays her eggs after the summer birds have flown, and may come forth on an inviting, warm winter day. The spring species lays her eggs early in the spring, before many of the birds are back. The female is wingless, and crawls up the trunk of a tree to deposit her eggs on bark or twigs. To stop her progress, about the trunk of the tree should be fastened a band of coal-tar mixed with oil or printer's ink, which should be put on very early in spring and moistened when dry in winter. The winter birds are a valuable aid in keeping down the cankerworm pest; the chickadee is an especial enemy, eating immense numbers of eggs and also the female moths. With the bursting of the buds the eggs hatch, and when the larvæ get through devouring foliage they spin themselves down to the ground, burrow into the earth two or three inches, there undergo transformation, and come forth as moths in April, occasionally in March. See Hodge: *Nature Study and Life;* Cragin: *Our Insect Friends and Foes.*

Can'næ (*kăn'-ī*), a town of ancient Apulia in Italy, on the bank of the River Aufidus, now Ofanto, famous as the scene of Hannibal's greatest victory over the Romans, Aug. 2, 216 B. C. With about 50,000 men the Carthaginian leader took up his headquarters at Cannæ. The Roman consuls, Æmilius Paulus and Terentius Varro, at the head of a fresh army of 86,000 men marched against him. The consuls commanded on alternate days, and while Æmilius did not wish to risk an open battle with the victorious enemy, Varro on his day of command joined battle on the plains near the town. Hannibal skillfully forced the Romans to take up a position with their faces toward the sun and toward a fierce wind which blew the dust against them. In this plight he, with his veteran troops, quickly threw them into confusion, almost surrounded them, and completely cut them to pieces. His own loss was small. Æmilius fell in battle, but Varro partly atoned for his rashness by skillfully conducting the retreat of the remnant of the army to Canusium.

Can'ning, George, an English statesman and orator, was born in London in 1770. At college he showed ability as a writer and speaker. He entered Parliament in 1794, and his first speech made a marked impression. He also, in company with others, published the *Anti-Jacobin*, a political newspaper, in which he wrote the well-known poem, *The Needy Knife-Grinder*. He helped in the abolition of the slave-trade, was treasurer of the navy, and twice secretary of foreign affairs. His career as foreign secretary conferred lasting benefits on his country. He was subsequently made prime minister; but his health gave way, and he died at Chiswick Aug. 8, 1827, in the same room in which Fox had died 21 years earlier. He was buried in Westminster Abbey near the tomb of the older Pitt.

Canning-Industry. The principle of canning goods rests on the destruction of the bacteria of decomposition within the can and the keeping out of air through which such bacteria might come in. The purpose of canning was, in the first place, to preserve food; but now it is used largely to save people the trouble of cooking their food themselves. The number of canning factories is now counted by the tens of thousands; the number of people directly employed is probably near two millions. These include many children. The centers of fish and oyster canning are Maryland, Maine, Washington and Alaska. Fruit is largely canned in New York, Illinois and Virginia; beef in Chicago and St. Louis. The essential machinery of a canning factory includes the heating apparatus for boiling and scalding the material to be canned, and for blanching the vegetables; the exhaust apparatus for taking the air out of the can before sealing; and the heating apparatus for sealing the openings by which the air was removed. These operations are most profitably performed with the use of a great deal of machinery to handle large quantities with as few workers as possible. Other machinery is used for the special kinds of canning. In canning peas, the peas are taken from the pods by machinery and sorted into different sizes by machinery. Corn is taken from the cob and cleaned from the silk, etc., cooked and placed in the cans, all by machinery. In the case of soups and other liquids the cans are dipped and filled by the use of machinery. It therefore is possible to attain to great cleanliness and purity in the manufacture of canned goods, and by an act of Congress, passed in 1906, it is believed that a system of inspection has been established that will insure purity in all canned meats manufactured since that time. The canning industry has transformed our diet, making it possible to eat all kinds of fruit and vegetables at all times of the year without destroying the flavor by the use of sugar or other preservatives. The condensed-milk industry has made it possible to keep cows with profit at a great distance from towns, where there are no facilities for making and selling butter or cheese.

Cannon are arms or artillery that cannot be fired by hand but must be fired from fixed rests. They were first used in the 14th century. The first were clumsy, wider at the mouth than the chamber and made of iron bars hooped with iron rings. The balls were first stone, afterwards iron. The early cannon had various names, as bombards or culverins; then they were named from the weight of the ball, as six-pounders; but now they are designated by the diameter of the bore, as 16-inch guns, or the weight, as a 25-ton gun. *Caliber* may mean either the diameter of the bore, or the ratio of bore to length.

Cannon are of three types, according to the angle at which they are fired. A *gun* launches its projectiles with high muzzle velocity at an angle not over 15 degrees above the horizontal. The projectiles reach their targets quickly and have great striking power. A *howitzer* uses higher angles, up to 43 degrees, the angle at which a projectile flies farthest. Because it uses higher angles, a howitzer can use low muzzle velocities, and the reduced wear makes howitzers the favored weapon when speed and striking power are not needed. "Lobbing over" shells upon an enemy battery is a typical howitzer task. A *mortar* uses angles over 43 degrees. Since that elevation gives maximum range, raising the muzzle of a mortar *shortens* the range. Mortars are used to hit targets behind vertical shelter, and to drop shells on the decks of hostile ships.

Within each type, cannon are made in various sizes. A field gun must be light enough to be movable by hand. Within this limit, experience has shown that the best type is a gun of about 3-inch bore, firing a projectile weighing 15 pounds. The newest types now range well over 10,000 yards. The French "75" was a field gun of 75 mm. (2.95 in.) bore, and by special manipulation and the use of light, "stream line" projectiles, could range over 10,000 yards.

The largest guns are the monsters used by modern dreadnaughts and the coast-defense, with bores of 16 and 18 inches. They fire projectiles weighing over a ton to distances of 20 miles and more. The greatest of all guns, however, was the German "Big Bertha," which fired an 8½ in. shell 75 miles into Paris during 1918, at the astounding muzzle velocity of 5,000 feet—nearly a mile—a second!

On land, the bigger guns usually are of the howitzer type, with ranges corresponding to those of similar-sized guns, but lower muzzle velocities. The larger ones can only be fired from solid platforms or railway mounts, since no wheeled carriage could withstand the recoil. By making them demountable and carrying the several parts on different carriages, surprisingly large guns can be *carried* on wheeled vehicles. They must be assembled and placed upon a special platform when fired. The surprising mobility of the Krupp 42 cm. and Skoda 30.5 cm. howitzers with which the Germans crushed the Belgian forts in 1914 was attained in this way.

The most important feature of modern cannon is the "long" or "sliding" recoil. In all older guns, the barrel was fixed to the axle, and could only be rotated up and down in order to change the range. At each shot the gun jumped back several feet and had to be pointed anew. Two shots a minute was the limit under such conditions.

In 1898 the French produced their "75"—the first and still the best "sliding recoil" field gun. In the "75," the barrel slid back, when fired, upon a support called a *cradle*, which in turn was fixed to the axle. Mechanism within the cradle checked the recoil gradually, and then drew the barrel back into firing position. Thus the carriage did not jump, and when it returned to normal, the gun still pointed properly. The gun only needed reloading—a matter requiring only a few seconds with the "75"—in order to fire again. Other nations use similar guns, but so far none of them are better than the original "75."

Naval guns use the same principle, but since they are bolted to the deck they can use more powerful checking mechanism. Even the largest therefore, recoil only about a foot, as compared with the 45-inch recoil of the typical field gun on wheels.

The next most important feature of land cannon is *indirect fire*, made possible by using a goniometric, or "angle-measuring" sight. For instance: suppose such a sight is set to point at a right angle from the bore. If the sight is then directed upon an object east of the gun, the gun itself will point north or south. By computing the angle to be set upon such a sight, artillery officers can cause a gun to be pointed upon any target desired. The gun can therefore be hidden from the enemy behind a hill, and when the cannoneers set their instruments as directed and point the sight at the chosen "aiming point," they can fire over the hill at an enemy they do not see, and—what is more important—at an enemy who cannot locate them save with airplanes or by tedious special methods.

Small field guns use *fixed ammunition*, that is, ammunition in which the projectile is fixed in the mouth of a brass cartridge case containing the propelling charge. A round of such ammunition for a field gun weighs about 18 pounds, and is all that one man can handle speedily. Larger guns load the powder and projectile separately. Six-inch guns use projectiles weighing about 100 pounds, and two men are needed to handle them. For guns above this size, mechanical loading devices are necessary.

Some idea of the ammunition used in war may be gained from the fact that many a "75" at Verdun fired over 2,500 rounds a day. A single gun thus consumed 22½ tons of ammunition daily! Incidentally, the gun itself wore out in three or four days. In many a battle, the Allies had over 75 field guns alone to a single mile of front, hurling, in many cases, over 1000 tons of projectiles a day upon the enemy!

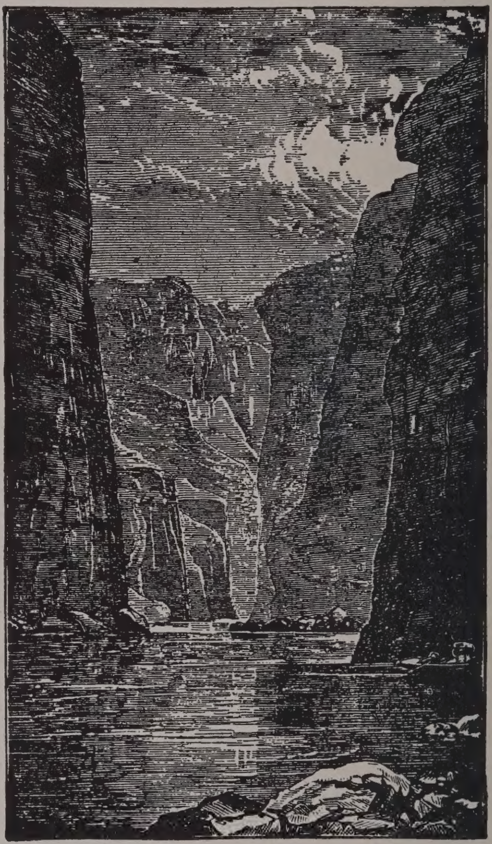
Practically all modern cannon are either "built up" or "wire wound." That is, the barrel consists of a small tube, with steel hoops shrunk on while hot to give the needed total strength. Instead of having hoops, the tube may be wound with wire, giving the "wire-wound" type. When the rifling is worn—which occurs in a field gun after several thousand shots, and in large guns after from 100 to 150 shots—the gun may be heated, the central tube removed, and a new one inserted. Thus the life of a big gun may be prolonged.

Cannon, Joseph G., was born in Guilford, N. C., of Quaker parentage, May 7, 1836. His family moved to Illinois. Working in a country grocery, he studied until he was prepared to pass the examination which permitted him to practice law in that state. From 1861 to 1868 he was states-attorney for Vermilion County, Ilinois, and was elected congressman for the 12th Illinois district in 1873. He served in Congress from 1873 to 1891, from 1893 to 1913, and from 1915 to 1923, failing of election only twice, when the whole country turned to the Democratic party. He was chairman of the committee on appropriations, for the 55th and 56th congresses. In 1903 he was elected Speaker, holding that office until 1911. His home for many years was Danville, Illinois. His energy, which he preserved in spite of his age, his kindly nature, his reputation for honesty and his inflexible opposition to extravagance in national expenditure made him popular. He died in 1926.

Cannon, Annie Jump, American Astronomer. Born at Dover, Delaware, Dec. 11, 1863; graduate of Wellesley, and Delaware colleges. She has been curator of astronomical photographs at Harvard since 1911. In 1914 she was made an honorary member of the Royal Astronomical Society. She has completed a catalogue of 220,000 stellar spectra, and has discovered about 200 variable stars, 3 new stars, and numerous stars having bright lines.

Canoe (*kȧ-nōō′*) a light, narrow boat, made of the hollow stem of a tree, or of bark, and moved by paddles. The American birch-bark canoe is light but very useful. A skeleton is made of light wood, the casing of birch bark is put on crosswise, and the strips sewn together with the fibrous roots of fir trees, the seams being dressed with gum. The birch-bark canoes of South America, and the native Australian gum-tree bark canoe are made of one piece of bark. Esquimaux canoes are generally made of seal or walrus skin, stretched over whalebone. Some Labrador canoes have a round hole in the center for the canoeist. Many of the Polynesian canoes are hollowed out of a single log. The largest Fiji canoes are 100 feet long, and double ones, 70 feet in length, can carry from 40 to 50 persons. Mr. Stanley on the Congo met a war-canoe with 40 men rowing on each side and ten in the bow, while eight men guided at the stern with ivory-tipped paddles. Canoes on the African inland lakes are sometimes made of reeds. The canoe has within recent years become popular in Europe and America as a pleasure boat. It is made of various materials, of tin, paper, India rubber, wood or canvas. The American Canoe Club has over 5,000 members. The *American Canoeist* is a magazine devoted to the interests of the sport.

Cañon (*kăn′yŭn*), a Spanish word meaning a tube or pipe, now in common use for a deep ravine or gorge worn by running water. Cañons are very numerous in North America. In many parts of the Rocky Mountains the streams have worked their way down through hundreds and, in some places, even thousands of feet. These cañons are of wonderful depth and size on the Colorado River, over the west slope of the Rocky Mountains. For 300 miles there is a nearly continuous cañon, from 4,000 to 7,000 feet deep. The rocks rear themselves in nearly vertical precipices on either side of the stream. In large parts of the cañon are numberless peaks and temple-shaped summits, and above the walls of the cañon rise plateaus and mountains piled up sometimes to an added height of 5,000 to 7,000 feet. In the interior of New York, near



MARBLE CAÑON, COLORADO RIVER

the headwaters of Seneca Lake, are several remarkable cañons, of which the most noted is that at Watkins, known as Watkins Glen.

Canossa (*kȧ-nŏs′sȧ*), a small town in Italy, near Modena, is famous for its ruined castle, once the scene of the most dramatic incident, perhaps, in all history. For centuries the German emperors, who were regarded as the divinely chosen successors of the ancient Roman Cæsars, contested with the papacy for the mastery of the western world. It was held by both the popes and emperors that Christendom was divinely ordained to be one indivisible empire, which they called the Holy Roman Empire, and that the kings of the nations were no more than their feudal vassals. It was admitted in theory that the pope was the spiritual head of this empire, and the emperor its lay or secular or temporal head. But during centuries the rivalry of popes and emperors became from time to time the signal for war. The last resort of the papacy was to excommunicate an emperor and, in so doing, to array his own vassals against him. Partly by this means in 1077 Pope Gregory VII, known as Hildebrand, forced the German Emperor, Henry IV, to stand before the castle of Canossa during three days as a penitent, barefoot in the snow and clad only in a woolen shirt. This was an admission of the supreme power of the papacy which was never forgotten. Although Henry VI himself and, after him, other emperors resumed the ancient strife, the Holy Roman Empire became in the fourteenth century little more than an idea and a name. See Bryce: *Holy Roman Empire;* and Tout: *The Empire and the Papacy.*

Canova (*kȧ-nō′vȧ*), **Antonio,** an Italian sculptor, was born in 1757, at Possagno, a village in Venetian territory. In boyhood he showed great talent in modeling, and spent many years in studying his art. His genius made him popular among his countrymen, and he was received with honor in many parts of Europe. He was made a marquis and given a pension. Among his earlier works, *Theseus with the Minotaur* established his reputation; and *Cupid and Psyche, Venus and Adonis, Penitent Magdalen, Palamedes* and *Perseus with the Head of Medusa* are celebrated works. He modeled a number of statues and busts. Among his later works was a colossal statue of Washington, in a sitting attitude, which was bought for the state house in Raleigh, North Carolina, but was destroyed by fire in 1831. Canova made a large fortune, which was almost entirely expended in works of charity. He was especially liberal to artists, and endowed all the academies in Rome. He died in 1822.

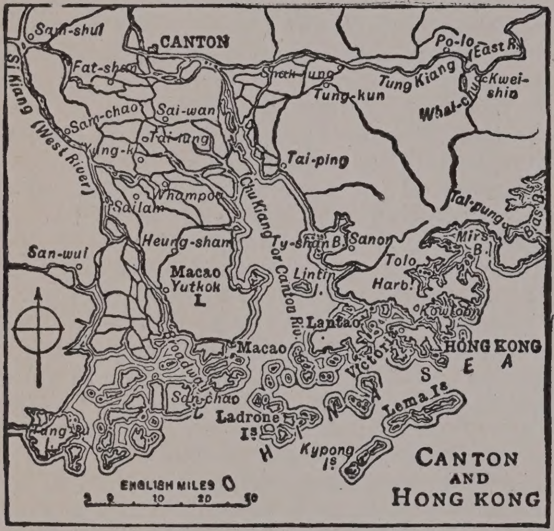
Canrobert (*kän′rō′bâr′*), **Marshal François Certain,** a French general and senator, born in 1809, and died in 1895. He held a command in the Crimean War, under Marshal St. Armand; but, disagreeing with the British allies, he was superseded by General Pélissier. In 1859 he took part in the war with Italy, and distinguished himself at Magenta and Solferino. In 1870, in the Franco-German war, he and his force were shut up in Metz and had to capitulate. In later life he was a member of the French senate.

Can′teen, The Army. A canteen is literally a soldier's drinking cup; the term is applied to a shop under the control of the military authorities where refreshments are sold and amusements afforded the soldiers. The refreshments have in practically all cases consisted largely of alcoholic beverages. In the American army the canteen or post exchange had for many years supplied the troops, at reasonable price, with such articles, the articles of ordinary use, wear and consumption, as were not supplied by the government, and afforded them "means of rational recreation and amusement, suitable to their station in life, which, if denied, they would seek outside the limits of the camp." "Every enlisted man is a stockholder in it." In practice the profits were derived largely from the sale of beer and light wines. In 1901 the Women's Christian Temperance Union and other advocates of total abstinence secured the passage by Congress of a law prohibiting the sale of intoxicating drinks in any post-exchange or canteen or army transport. As a consequence most of the army-canteens were closed, apparently for the reason that without the profits on the sale of beer and wine they could not be operated. Congress therefore in 1902 and again in 1903 voted $500,000 in aid of such canteens. But the army has not, it seems, to any considerable extent availed itself of this provision.

Can′terbury Cathedral, one of the finest cathedrals of England, stands in the city of Canterbury, fifty-six miles southeast of London. The occupant of the episcopal see of Canterbury is primate of all England. The foundation of the cathedral dates back to the year 596, when St. Augustine consecrated there an old Roman Christian church under the name of Christ's church. It was burned in 1067 and again in 1174, and finally in 1872 was damaged by fire. During its long existence, it has been altered, beautified and enlarged. The length of the building is 532 feet and its greatest breadth 154 feet. The great tower, 230 feet high, is of remarkable beauty. The stained-glass windows are of the richest colors, and the crypts or chambers beneath are the finest in England and contain several chapels. Before the high altar the famous archbishop, Thomas à Becket, was murdered in 1170. About the year 1500 the yearly offerings at his shrine amounted to $20,000, and when the shrine was torn down in the 16th century its treasures filled twenty-six carts. The stone steps leading to it were worn by the knees of countless pilgrims. There are many monuments in the cathedral.

including those to the memory of Henry IV and the Black Prince. Near by is Kings' School, founded by Henry VIII, where David Copperfield, of Dickens' creation, went to school.

Can'ton, called also Yang-Ching, "the city of rams,'' a large city in the south of China and capital of the province of Kwang-Tung, lies on the bank of the Shu-Kiang or Pearl River. The city is surrounded by walls from twenty-five to forty feet high, twenty feet thick and six miles around. A wall running east and west divides it into the old and the new city. There are many gates shut and guarded by night, named Peace Gate, Eternal Rest Gate, etc. Across the river are the *hongs* or European quarter, separated from the river by a quay, 100 yards wide. There are more than 600 streets, generally less than eight feet wide and very crooked. Ancient barricades inclose each street, and in the principal streets night watchmen in watchtowers proclaim the hours and sound fire-alarms, Property is so insecure that every shop which contains anything valuable must be barricaded at dusk, so that it can stand a siege, and all business must cease at sunset. There are two pagodas, one erected ten centuries ago, the other over thirteen centuries ago, and nearly 150 other temples or joss-houses. One of the largest temples covers with its grounds seven acres and has 175 priests attached, and the temple of "Filial Duty" has 200 priests. The priests and nuns together in Canton number over 2,000, most of them being Buddhists. The "Temple of Five Hundred Genii'' has 500 statues in honor of the Buddha and his disciples. Examination Hall covers sixteen acres, and has 8,653 cells. Nearly half the craft on the river are utilized as fixed residences, with a floating population estimated at 200,000. Tea, silk, sugar and cassia are the chief articles of export, and the chief imports are cotton, wool, metal goods, food stuffs, opium, kerosene, etc. Over 3,000 ships enter and clear the port yearly. Canton has long been a favorite port with foreign merchants. Its earliest annals date back to 200 B. C. In 700 A. D a regular market was opened and a collector of customs appointed, and 200 years later the Arabs made regular voyages thither. The Portuguese found their way to it in the 16th century, and the Dutch 100 years later These in turn were overtaken and overthrown by the English before the close of the 17th century, and an immense trade was carried on by the agents of the East India Company. The city was captured by French and English forces in 1857, and was garrisoned by them until 1861. The exports of Canton (chiefly of tea, silk and sugar) were valued in 1905 at 37 million *taels*. (The *tael* is about $1.40.) Estimated population, about one million.


CANTON AND HONG KONG

Canton, the county seat of Stark County, Ohio, is 102 miles west-northwest of Pittsburgh, 54 south-southeast of Cleveland. It has three railroads, the Pennsylvania, the Wheeling and Lake Erie, and the Baltimore & Ohio. It is situated in a rich farming district, surrounded by deposits of coal and limestone.

Among its many manufacturing establishments are the United Alloy Steel Co., the largest of its kind in the world; Timken Roller Bearing Co.; Diebold Safe and Lock Co.; Hoover Suction Sweeper Co.; Dueber-Hampden Watch and Case Co.; Republic Stamping & Enameling Co.; Harvard Dental Chair Co.; Metropolitan Brick Co.; and the Pennsylvania Railroad shops. Canton's varied manufacturing interests have been responsible for its growth from a city of 10,000 in 1870 to one of more than 90,000 now. The city has two daily and four weekly newspapers, more than thirty churches, fourteen banks, three hospitals, four high schools and twenty-six grade schools. The school enrollment is about 17,000. Canton was the home of President McKinley.

Canute (*kă-nūt'*) or **Cnut,** called the Great, king of the English, Danes and Norwegians, was born about 994. His father, Sweyn, king of Denmark, died in the midst of his conquests in England, and Canute immediately began a struggle for the English throne. He landed with a powerful force and soon overran a large part of England. The struggle ended by the division of the country between Canute and the Saxon, Edmund Ironside, while the death of Edmund in 1017 gave the whole kingdom to the young Danish conqueror. He put to death some of the more powerful English nobles, but from this time onward, until his death in 1035, his character seems to have been completely changed. At once he laid aside his ruthless, revengeful temper to become a wise, temperate, devout and law-abiding ruler. He made a pilgrimage to Rome, and wrote back a letter to his subjects which shows the noble simplicity of his character and the high idea he had formed of the duty of a king. The death of his elder brother brought him the throne of Denmark, and that of Norway soon followed. Canute gave England eighteen years of peace and order, but at his death his kingdom fell to pieces, as it had depended upon his own personal greatness. A story is told of how this monarch rebuked the flattery of his courtiers, who had said that all things were possible to him. He had his chair placed on the seashore while the tide was rising, and when the water came near him, he ordered it to go back and not to wet him who was lord of the sea. But the water soon wet his feet, and turning to his courtiers, he said: "Let all men know how empty and worthless is the power of kings; for there is none worthy of the name but Him whom heaven, earth and sea obey."

Canvasback (*Aythya Vallisneria*), a North American freshwater duck, extensively found in marsh lands and river flats, where it can obtain its favorite food, the roots of the wild celery plant. It is largely found in Chesapeake Bay, in the Mississippi Valley and around the shores of Lake Huron and Lake Erie. Its breeding grounds are the far north, whence it comes southward late in autumn, and affords good game for the gunning sportsman, for it is expert in diving and rapid in its flight when pursued and shot at. A related bird is the redhead, often mistaken for the canvasback, though its plumage is brighter in color and it has not the latter's fondness for a celery diet. In length the canvasback is usually about 20 inches, with a blue-colored bill, the male bird having a reddish head, modified by dusky tints, with a dotted and lined coarse canvas-like back and sides. See Duck.

Cape Breton (*brĭt'ŭn*), a rocky island in the shape of a triangle, in the Canadian Dominion, at the eastern end of Nova Scotia, and forming part of that province, from which it is separated by the Gut of Canso, one mile broad. Its greatest length is 100 miles, its width 85 miles and its area 3,120 square miles. The coast is indented with bays. The Bras d'Or, an inlet on the east, forms a lake 50 miles long and 20 broad, so that most of the interior can be reached by water. This lake is now continued by a ship canal to St. Peter's Bay, on the south coast, dividing the island into two parts. The main exports are timber, fish, iron ore and coal, and the soil yields grains. At first held by the French, Cape Breton was taken by the English in 1745, and in 1820 became part of Nova Scotia. The towns are Sydney, North Sydney and Port Hood. The once famous Louisbourg is now a mere village. Cape Breton sends two members to the Nova Scotian legislature. Its exports consist of coal, timber (pine and oak) and fish. Population of the whole island, including the district of Cape Breton, Inverness, Richmond and Victoria, 97,605.

Cape Cod, a sandy peninsula reaching into the Atlantic, and forming the southeastern extremity of Massachusetts. In form somewhat like the letter L, it is about 65 miles in length. There are many lighthouses upon the cape. On the northern end, called Race Point, is a revolving light, 155 feet above the sea. At the head of the cape are forests of pitch-pine and oak trees. The numerous bays furnish many harbors, where are thriving villages which are nurseries of seamen. Cape Cod was discovered May 15, 1602, by Bartholomew Gosnold, who gave it its name from the quantity of codfish taken off its shores. On November 9, 1620, the *Mayflower* arrived at its coast, and the next day cast anchor in its harbor of Provincetown. Here was formed the famous compact which gave a government to the new colony. Bancroft called it the first of written constitutions. It, like our national constitution, was the creation of the people itself.

Cape Colony or **Colony of the Cape of Good Hope,** is a British possession at the southern extremity of Africa. It includes, East Griqualand, Bechuanaland and adjacent native territories, which have an area of 276,995 square miles. The area of the whole of British South Africa (including the now reannexed Transvaal and the Orange River Colony) together with Bechuanaland, Natal, Cape Colony and Rhodesia is estimated at 603,337 square miles.

Surface—Drainage. It has few navigable rivers or good ports. The principal harbor is Table Bay. Running parallel to the coast line and at an average distance from it of about 150 miles there is a range of mountains, forming the watershed of the country and known by various names as it stretches across the continent—Stormberg, Sneeuberg, Roggeveld Mountains. The eastern part of the colony is fairly well wooded and watered, and presents much beautiful scenery; the western part is covered with the karroo bush, which supports the large sheep farms.

Climate—Irrigation. The climate is one of the finest in the world, well suited to Europeans, and the Cape has long been known as a health resort. The scanty rainfall makes irrigation necessary. One vast reservoir, the largest in South Africa, draining 460 square miles, holds 35,000,000,000,000 gallons, and the extent of water surface is 19 square miles, with an average depth of ten feet. The climate and soil of the country are suited to the culture of vines, and in the southwestern part the vines produce heavier crops than are known almost anywhere else in the world. Dagga or wild hemp was smoked by the natives before tobacco was introduced, which is now widely grown.

Animals—Flora. The native animals were once numerous and varied, but are now nearly extinct. There still are a few elephants and buffaloes, and the beautiful springbok and smaller antelopes are still found, with baboons, monkeys, wildcats, porcupines, leopards, jackals and ant-eaters.

Among birds the secretary-bird, honey-bird and weaver-bird are peculiar. The iguana, cobra, puff-adder and other snakes abound, and the white ant covers the face of the land with its habitations, from two to four feet in height. It is probable that no single country has contributed so largely to the world's conservatories and botanical gardens as the Cape.

Natural Resources. Diamonds have been extensively found in the colony; while in Transvaal, at Johannesburg, not far from Kimberley, are the rich gold fields of the Rand. The Kimberley mine, the richest diamond-mine in the world, covers about twenty-five or thirty acres and has been sunk to a depth of over 600 feet. This mine, with three others, forming a circle of three and one-half miles in diameter, forms what is sometimes called the diamond fields. The finest diamond, the Porter-Rhodes diamond, was found in 1880, and is valued at $300,000. A yellow diamond, 428½ carats, as large as a hen's egg and said to be then the largest diamond in the world, was found in 1888. The largest yield from these famous diamond mines in any one year was in 1905, the value being over $32,000,000. Gold, copper, coal, iron and salt are found, besides valuable stones, such as garnets, agates and jaspers.

Exports and Industries. The principal exports are gold, diamonds, wine, wool, ostrich feathers, Angora hair, copper-ore and hides; the chief imports are cloths and dress goods, iron, leather manufactures, machinery, railway supplies and food and drink. More than three quarters of the trade is done with Great Britain and the British possessions. Besides the diamond-mines, the colony has many flour and saw mills, tanneries, breweries, tobacco factories and coach-building works. In 1904 there were 2,527 industrial establishments, employing 30,318 hands, with machinery and plant valued at more than ten million dollars.

Education. Education has not been made compulsory, and of the white population in 1904, twenty-two per cent could not read or write. There are a university and seven colleges in the colony, and 143 public libraries with a total of nearly 500,000 volumes. Private schools, generally under religious auspices, are aided by the government, the amount expended on education in 1904–5 reaching £447,796.

Internal Improvements. Over 3,180 miles of good roads and over 3,300 miles of railroads have been built throughout the colony. Four large bridges span Orange River, and two others cross the Kei and Vaal Rivers. Almost every town is in communication with Cape Town by telegraph, and there are nearly 1,100 postoffices.

Cities. The chief towns, with the inhabitants as estimated by the 1911 census, are Cape Town, 67,000; Cape Town and its suburbs, 169,641; Kimberly, 34,260; Port Elizabeth, 32,921; Graham's Town, 13,877; Beaconsfield, 14,000; Paarl, 11,28 King William's Town, 9,500; East London, 24,054; Graff-Reinet, 10,072; Worcester, 8,087; Uitenhafe, 12,199; Cradock, 7,762.

Government and History. The executive is vested in a governor, appointed by the British crown, with a legislative council and a house of assembly. In the Cape parliament speeches may be made both in English and in Dutch. There is a university at Cape Town, but no state-church. The capital is Cape Town; population, with suburbs, 169,641. In 1652 the Dutch East India Company took possession of the Cape and held it until it was turned over to the English in 1814. Its real growth dates from the British occupation. Since that time the establishment of responsible government in 1872, the emancipation of the slaves in 1838 and the Kafir and Boer wars have been the main events in the history of the colony. Population, 2,698,980, of which 2,028,104 are natives and the remainder whites. Unlike the aborigines of other parts of the world, the natives are constantly increasing. See Boer War for late history.

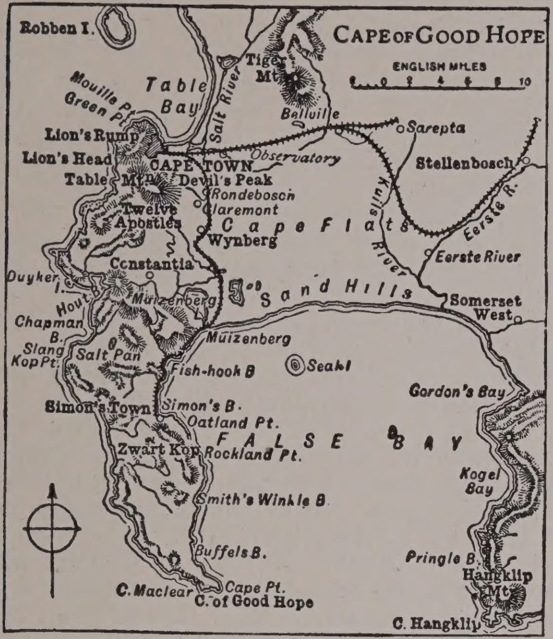
Cape Hat′teras, the most easterly point of North Carolina, separated from the mainland by Pamlico Sound. South of Delaware no land stretches so far into the Atlantic as does Cape Hatteras. Nor is any point on the coast more noted for its frequent and dangerous storms. The Gulf Stream flows within twenty miles of it. There is a lighthouse one and one fourth miles from the outermost point.

Cape Horn, the headland of an island in the Fuegian archipelago, commonly regarded as the southern extremity of America. It is a steep, black rock with bare and lofty sides. It was probably first discovered by Sir Francis Drake, in 1578; but it was first doubled by the Dutch navigators Lemaire and Schouten in 1616, the latter of whom named it after his native town of Hoorn. The cape is no longer rounded by steamers, which now always pass through the Strait of Magellan.

Cape May, a town occupying a point of land of the same name at the southern end of New Jersey at the entrance of Delaware Bay. It is a noted summer resort, the favorite watering-place for Philadelphians. It is connected with Philadelphia by the Pennsylvania and Philadelphia & Reading railroads, and in summer by several lines of steamers. The beach is over five miles long, and affords splendid drives. Population, 2,471.

Cape of Good Hope, a point commonly called the most southerly promontory of Africa, is really a little north of Cape Agulhas. It forms the turning point from south to east on the voyage from Europe to India. The cape is formed by the extremity of Table Mountain, which, as it recedes, rises from a height of 1,000 feet above the sea to 3,582 feet. It was discovered and doubled by Diaz, a Portuguese navigator, as early as

1486, when he was aiming to reach India, as Columbus by another route was aiming, six years later, to reach the same country. Because of the dangers he had passed through, he named it the Cape of All the Storms, but John II of Portugal renamed it Cape of Good Hope. In 1497 Vasco da Gama rounded it on his adventurous voyage from Lisbon to Calicut. The result of the discovery of the route by the cape was not only to open a new channel for the traffic of the east, but also to remove the supremacy of trade from the republics of Italy to the states of western Europe.


CAPE OF GOOD HOPE
ENGLISH MILES
0 2 4 6 8 10
Robben I.
Mouille Pt.
Green Pt.
Table Bay
Salt River
Tiger Mt.
Belluille
Sarepta
Lion's Rump
Lion's Head
CAPE TOWN
Observatory
Stellenbosch
Table Mt.
Devil's Peak
Rondebosch
Claremont
Twelve Apostles
Cape Flats
Kuils River
Eerste R.
Wynberg
Eerste River
Constantia
Duyker I.
Hout
Muizenberg
Sand Hills
Somerset West
Chapman B.
Slang Kop Pt.
Salt Pan
Muizenberg
Fish-hook B
Seal I.
Gordon's Bay
Simon's Town
Simon's B.
Oatland Pt.
FALSE BAY
Zwart Kop
Rockland Pt.
Kogel Bay
Smith's Winkle B
Buffels B.
Pringle B.
Hangklip Mt.
C. Maclear
Cape Pt.
C. of Good Hope
C. Hangklip

Cape Town, the capital of Cape Colony, lies at the head of Table Bay, thirty miles north of the Cape of Good Hope, a southwestern extremity of Africa. It was founded in 1652 by the Dutch, and at first consisted of a few houses under the shelter of a fort. In 1806 it was occupied by the British. The houses of old Cape Town are mostly flat-roofed, oblong and whitewashed. A few church-towers and an occasional factory or mill-chimney break the monotony. Government house, the new and handsome houses of Parliament, the public library and museum, the fine-arts gallery, the railroad station, the old Town House and the old castle are the chief buildings, together with several banks, the buildings of the Supreme Court, an observatory, a cathedral, four or five colleges and an examining university without attached teaching institutions. The see-houses of the Anglican and Roman Catholic bishops are also here. There are many modern city improvements, such as water-works, gas, street-railroads. The breakwater and docks have given increased facilities to the shipping. The population of Cape Town proper is 67,000; including its suburbs, 169,641. See Cape Colony and Cape of Good Hope

Cape-to-Cairo Railway. This great railway enterprise, in large measure due to the bequest left in the will of the late Alfred Beit, which is to connect Cape Town with Cairo through the whole length of the eastern regions of the continent of Africa, has of late been much advanced. Already the road now runs from Cape Town northward far beyond Broken Hill near the Zambezi River, a distance of over 2,100 miles, while the surveys have been completed as far as Lake Tanganyika and the southern frontiers of the Congo Free State. It is then projected northward past Lake Victoria into British East Africa; thence it will proceed to the Anglo-Egyptian Sudan; and it will connect at Khartum with the Sudan military railway now open to Cairo and the Mediterranean Sea. Other branch-roads are also projected, while the scheme, vast as it is, seems now to be taken out of the category of dreams.

Cape Verd (*verd*) **Islands,** a group of islands, forming a Portuguese colony, in the Atlantic Ocean, off the African coast, 320 miles west of Cape Verd. There are 14 islands and several rocky islets, covering about 1,480 square miles. They are all of volcanic origin, and one, Fogo, still smokes. The shores are low, but in the interior there are high mountains. The rainy season lasts from the middle of August to November, but sometimes no rain falls for several seasons. In 1832, after a three years' drought, 30,500 persons perished. The fruits of southern Europe and western Africa flourish on the islands. Goats and asses are reared, and the most remarkable of the animals are monkeys and bisam cats. Poisonous reptiles are unknown. Salt is manufactured and exported to North America. The other products are coffee, millet and drugs. The natives are docile and lazy, though very religious. Roman Catholicism is the only religion. The population is 147,424, about one twentieth being whites and one seventh slaves. The latter are of mixed race, descended from Portuguese settlers and negroes of various tribes introduced from Guinea. Santiago is the largest island in the group; it is about 50 miles long and 23 broad at its widest part. The governor lives on the island, at the seaport of Porto Praia. The volcano of Fogo is 9,157 feet high. The islands were discovered in 1441 by the Portuguese, who have held them ever since.

Caper'naum, a town of Palestine, often mentioned in the New Testament and memorable as the scene of many of the miracles of Christ. Its exact site on the Sea of Gennesareth is uncertain. One possible site is a ruined village, known at present as Khan Minieh; another is three miles further off, at a spot called Tell Hum.

Cap'illar'ity in Soils refers to the ability of water to rise above the water-table toward the surface. The soil-particles act as an absorbing medium, just as a lampwick does; the fluid in both cases passing up through the small spaces. The smaller the particles, and consequently the closer they are, the more effectively the water rises, just as in a glass-tube of very fine bore it rises better than in a larger tube. Tramping down the soil after planting small seeds presses the soil-particles together, and induces an upward flow of moisture that enables them to sprout. When the surface particles are compacted by sun-baking into a crust after the summer rains, the moisture easily passes into the air and is lost to the soil and the plant roots. On the other hand, breaking up this crust by cultivation forms a soil-mulch, whose larger spaces interfere with capillary action and prevent loss of moisture. The so-called dry-farming of the semi-arid region is based on this principle, repeated cultivation being resorted to in order to conserve the moisture.

Cap'itoline Hill, one of the seven hills of ancient Rome. It was consecrated to Jupiter, and on it stood a temple of Jupiter, called the Capitol, and also the citadel. The foundations were laid by Tarquinius Priscus, one of the early Roman kings; but the building was not completed until the expulsion of the kings. It was three times burned and successively restored. In it were three shrines, to Jupiter, Juno and Minerva. At the porch of the temple the people were feasted on great occasions. Here were kept the important public documents. Other temples were built later on the hill to Mars, Venus, Fortune, etc. A library and other public buildings were also erected on the hill. At the south end was the Tarpeian Rock, down which state criminals were thrown headlong. In modern times the top of the Capitoline Hill forms what is known as the Piazza del Campidoglio, surrounded on three sides by palaces. A broad flight of steps leads up to the piazza, upon which are numerous statues. In the palaces are many objects of interest: statues, busts, galleries of pictures; the famous Bronze Wolf; a tomb on which are bas-reliefs telling the story of Achilles; and the well-known statues of the *Dying Gladiator*, the *Antinous of the Capitol* and the *Faun* of Praxiteles. In the hall of illustrious men are 93 busts of notable Greeks and Romans, and in the hall of the emperors is a series of 83 busts of emperors and empresses. The famous *Venus of the Capitol* is preserved in a cabinet, not open on public days.

Capri. See GARIBALDI.

Caprivi (*kä-prē'vē*), **Count Georg Leo von,** German general, statesman and chancellor (1890–94), was born in 1831 and died February 6, 1899. Entering the army in his 18th year, he won rapid promotion, and served with distinction in the campaigns of 1864 and 1866. In 1883 he was given command of the 30th division of the imperial army at Metz, and for a time was also at the head of the German admiralty and reorganized the navy. He was subsequently given command of the 10th or Hanoverian army corps, the finest in the German army. In 1890, on the fall of Bismarck, Emperor William made him his new chancellor and minister for foreign affairs. In October, 1894, owing to friction with Count Eulenberg over the agrarian malcontents, he resigned office, Prince Hohenlohe succeeding to the chancellorship.

Cap'sule, in botany a dry fruit composed of more than one carpel, which splits open to discharge its seeds. See FRUIT.

Capua (*kă'pū-ȧ*), a fortified city in Campania, Italy, on the River Volturno, 27 miles north of Naples. Ancient Capua was about three miles distant from the present city. It probably was founded by the Etruscans as early as 800 B. C. It fell under the sway of the Samnites and, later, of the Romans. After the battle of Cannæ it deserted to Hannibal, after whose defeat the city suffered severely. Capua was formerly a luxurious city, and was noted for its gladiatorial shows. It was from the school of gladiators here that Spartacus, with 70 companions, broke forth and organized the insurrection of the slaves. The city was overrun by the Vandals in 456 A. D., and finally destroyed by the Saracens about 840. A few years later, the inhabitants returned and built the present city. There still remain the ruins of an amphitheater capable of holding 60,000 people.

Capuchins (*kăp'ū-chinz*), a mendicant order of Franciscan monks, founded in 1528; they derive their name from the cowl or stuff-cap (*caputium*) they wear. They live chiefly by begging, and go about barefooted, unshaven and generally garbed in brown or gray. The order is most numerous in Austria, and is not unknown in the United States.

Carácas (*kȧ-rä'kȧs*), the capital of the republic of Venezuela and of the federal district, is six miles from La Guaira, its port on the Caribbean Sea. Built on the slope of the Avila (8,635 feet), it is 3,025 feet above the tide-level, and from its elevation it has an enjoyable climate. There are numerous public parks and gardens and handsome promenades. The most notable buildings are the federal palaces, the president's Yellow House, the university, whose library of 30,000 volumes is open to the public; the exhibition palace, the cathedral and the splendid basilica of St. Ann. Besides the university, there are various colleges and technical schools. There are many newspapers. Carácas is the terminus of four railroads. Its chief export is coffee through the port of La Guaira; also cocoa, caoutchouc, ornamental feathers and furniture woods. Population, 75,000.

Caracci (*kär-rät'chē*) or **Carracci**, a celebrated family of Italian painters, the founders of what is called the Bolognese school of painting, which flourished in the latter half of the 16th century. Ludovico Caracci, son of a butcher, was so poor a student that his masters advised him to give up painting. Instead of following their advice, he went to Parma and Venice, and there studied the works of the great masters, and came back filled with new ideas of his art quite different from the lifeless style of his native Bologna. With his two cousins, he started the eclectic school, which has become famous in the history of painting, and soon all other schools at Bologna were closed. Many of the works of this master are preserved at Bologna.

Annibale Caracci, a cousin of Ludovico, was, perhaps, the greatest artist of his family. He was born in 1560. He made rapid progress in the study of painting, and his fame soon reached Rome, where he was employed to paint the Farnese gallery, his greatest work. He died at Rome in 1609, and was buried close to Raphael's tomb in the Pantheon. The best Italian masters of the 17th century were of the school of the Caracci.

Car'avans are bands of merchants, pilgrims or other travelers who journey in company through the desert. The name caravan is of Persian origin; the deserts of Asia and Africa are its home. Here travelers seek safety in numbers, as well for defense against robbers as for the sake of aiding one another amid other perils of the way, the chief of which are storms of dust and whirlwinds. The hot and sand-laden wind, called in the Sahara Desert the simoom, has been known to destroy a whole caravan by suffocation. Not seldom does a line of half-buried bones of camels and of men greet the eye of the desert voyager. In the case of caravans from Tibet to China, yaks, mules and horses are used rather than camels.

Large and famous are the annual caravans which convey pilgrims to Mecca from Persia and from Cairo in Egypt. Several thousands of pilgrims will sometimes journey to Mecca in a single caravan. The internal long-distance trade of Asia and Africa is almost wholly a caravan trade. The chief overland trade-route between Russia and China runs close to the Siberian Railroad from Moscow to Irkutsk and thence to Kiakhta and Urga. A vast quantity of cotton goes by caravan from Khiva to Orenburg. Persia relies greatly upon caravans, since, except for its Russian trade, it is but ill-supplied with railroads. In the hot season it is usual for the desert caravans to travel by night; but they keep to as fixed a route as do ships at sea, as indeed the perils of their course are at least as great.

Car'bohy'drates (in plants), substances consisting of carbon and of hydrogen and oxygen in the proportion to form water, which are manufactured by green plants out of carbon dioxid and water in the presence of light. (See Photosynthesis.) Common illustrations of carbohydrates are sugar and starch.

Car'bon is one of the elements, and is the characteristic substance of plants and animals. It is found uncombined in the mineral, graphite or black lead, and in the pure, crystallized form in the diamond. Anthracite coal, charcoal, coke and lampblack are nearly pure forms of carbon. Soft coal and peat also contain much carbon. United with oxygen it is carbon dioxide or carbonic acid, a constituent of the atmosphere and of carbonates, of which calcium carbonate as limestone, marble, chalk and the earthy matter of corals and shells, as well as dolomite, are very abundant substances. With hydrogen, carbon forms marsh-gas and a great number of hydrocarbons, as those of petroleum and numerous coal-tar products. With hydrogen and oxygen it forms acetic acid and other organic acids, alcohol, oils, fats and the so-called carbohydrates, of which the sugars, starch and cellulose, important constituents of plants, are the best known. A great many very complicated carbon compounds occur in plants, and particularly in animals, in which (besides carbon, hydrogen and oxygen), nitrogen and sometimes sulphur and other elements are present. Carbon also unites with certain metals, and with iron it forms steel and cast-iron. Certain denser forms of carbon, such as retort-carbon from gas-works and petroleum-refining, conduct electricity well, and are extensively used in batteries and electric lamps. See Charcoal, Chemistry, Diamond and Electric Light.

H. L. Wells.

Car'bondale, a city of Pennsylvania, noted for the mines in its neighborhood, is on the Lackawanna River, 16 miles northeast of Scranton. It is the chief town of Lackawanna County, and its railroad facilities are furnished by the Delaware & Hudson; the New York, Ontario & Western; and the New York, Erie & Western railroad. The mines of the region are worked by the Delaware and Hudson Canal Company, and yield over a million tons annually. The city's industries have as their motive power abundant electrical and other facilities, derived chiefly from the great adjacent coal-fields. Population, 20,000.

Carbon'ic Acid or carbon dioxid, also called fixed air or choke-damp, is a gas which forms about $\frac{1}{2500}$ part of the air.

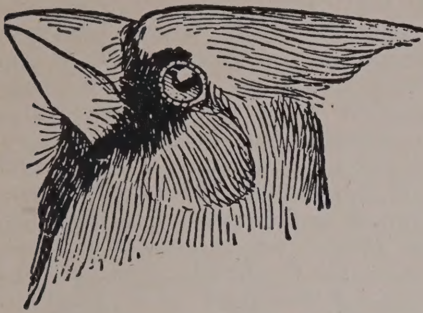
Enormous quantities of it are poured into the air by the breathing of animals and the burning of fuel, but plants absorb it by their leaves to get carbon for the formation of wood, and in this way the proportion is kept quite constant. Carbonic acid contains by weight 12 parts of carbon and 32 of oxygen. It is a dense gas, heavier than air, and can be poured from one vessel to another like a liquid. In vats in which it is being given off by fermentation, it remains at the bottom for some time, even when freely exposed to the air, so that fatal accidents have resulted from workmen carelessly entering them. Under a pressure of about 600 pounds to the square inch it becomes a liquid. When this liquid is allowed to escape through a small jet, it rapidly evaporates and causes intense cold, so that a certain portion becomes frozen into a solid resembling snow. This solid passes back into a gas without becoming a liquid. Carbonic acid can be easily dissolved in water. The sparkling appearance of soda and seltzer waters, etc. is produced by the carbonic acid which has been dissolved under pressure, and so passes out when exposed to the air. Champagne and fermented ginger beer contain carbonic acid by a natural process of fermentation. The pure gas, or air containing considerable quantities of it, causes suffocation when breathed, because the lungs do not get the necessary oxygen. It does not support burning. If a lighted taper is thrust into a vessel of it, it is immediately put out. Carbonic acid may be readily prepared from chips of marble and hydrochloric acid.

Car-Building. While the term car strictly means any wheeled vehicle, in America it has been applied only to railway cars, in the first instance, but has been extended recently to automobiles or motor-cars. Automobile building will receive separate treatment. The most distinctive feature of the car is the truck, which consists of a frame, one at each end of the car, with two, four, six or even eight wheels underneath, and on the top a swivel, on which the car-body rests, so that it can move freely on the trucks under all the varying conditions of the road. The wheels are of many kinds, agreeing, however, in rejecting the spoke and axle arrangement which most wheels have. Moreover, the wheels do not turn on the axle, but are fixed firmly upon it, by shrinking or other means, and the axle turns in the axle box. The wheels have flanges to keep them on the rails. The car rests on two sets of springs, one vertical, which supports a frame, from which the other, an elliptical spring, is suspended. The car rests immediately on the latter. The car-body is of many types. The finest is the Pullman car. This was first built about 1867 by George Mortimer Pullman; they are for the most part built at the Pullman works near Chicago. The latest modifications are cars in which the berths are put under the floor, when not in use, and the car itself turned into a parlor-car. The pressed-steel car is built at Pittsburg; in it every part of the car is built of steel. Pullman cars commonly have a steel framework which embraces the platform, so as to form what is called a solid vestibule-train. Their strength has saved many lives in our numerous accidents. American cars differ from those of other countries in their greater size and in having the aisle run up the middle of the car. Among freight-cars the most noteworthy are the refrigerator-cars, which are largely built and owned by private companies, such as the Armour Company and the Swift Refrigerator Company of Chicago. Special cars are used to carry enormous loads of coal from the mountains of Pennsylvania to the coast cities. The Standard Oil has built special tank-cars for its oil. Most of the regular freight and passenger-cars are now built at the shops of the several railroad companies. There are special features, such as automatic couplers, now compulsory on all cars, air-brakes, gas-lighting and heating from the steam of the engine. In most countries of Europe they still employ foot-warmers which can be filled with hot water at certain stations.

Cardenas (*kär'dâ-nâs*), **Cuba,** a seaport in the province of Matanzas, situated on the north side of the island, 78 miles east of Havana, with which it is connected by rail, as well as with Santa Clara, Cienfuegos and Matanzas. It is the chief port for the export of sugar, and has besides a considerable local commercial trade. It is an attractive city, with many fine plazas and public buildings. In our war with Spain, Cardenas Bay was the scene of a sharp engagement between our blockading vessels and the Spanish batteries, in which the first American officer to lose his life in the war (Ensign Worth Bagley) was killed. Population, 28,576.

Car'diff, a seaport town in southern Wales, on Bristol Channel. It is noted for its magnificent docks, from which several millions of tons of iron and coal are exported yearly. Cardiff is well known in history. The Arthurian legend of the sparrow-hawk refers to Cardiff. King Henry I imprisoned, for 26 years, until his death, his brother, Duke Robert, in the old castle, which still stands. The castle was once of enormous strength, and is now the mansion of the Bute family, to whom the present prosperity of Cardiff is largely due. At Cardiff there is a branch of the University of Wales, with a teaching staff of 55 and with 661 students. Population, 182,280.

Cardinal-Bird, one of the finest song-birds of America, whose habitat is the southern states, with kindred species frequenting Mexico, Central America and Lower California. It is sometimes called the Virginian nightingale, the bird having a clear, whistling and melodious song. Its beautiful plumage and attractive song make it a favorite cage-bird, while it is usually hardy, even in confinement. The male bird is of a bright red color, marked with black, and is adorned with a high crest; he is devoted to his mate when breeding; the eggs, usually not over four in number, are in color a speckled white or blue, spotted with brown.



CARDINAL-BIRD

Ca′rey, Henry Charles, American political economist, was born at Philadelphia in 1793 and died there on October 13, 1879. In early years he was associated with his father as a bookseller and publisher, and for a time was at the head of the firm of Carey & Lea. In 1835 he became a close student of political economy, in the ranks of those opposed to the rent-doctrine of Ricardo and the theory of population of Malthus. His chief writings embrace *The Principles of Political Economy; The Credit System in France, Britain and the United States; Principles of Social Science; The Unity of Law*, etc. He was a protectionist, and opposed to international copyright.

Ca′rey, William (born 1761, died 1834), a Baptist missionary and Oriental scholar, was born in Northamptonshire, England. In 1793 he was sent out as a Baptist missionary to India. He established a printing-press at Serampore, and published dictionaries and grammars of several eastern languages. From his press there issued 200,000 Bibles, in about 40 different languages or dialects. He was made professor of Oriental languages in the college at Fort William, Calcutta. The Protestant mission-movement of the 19th century regards him as its father.

Cargados or St. Brandon Islands are dependencies of Mauritius, and for the most part mere sand-banks.

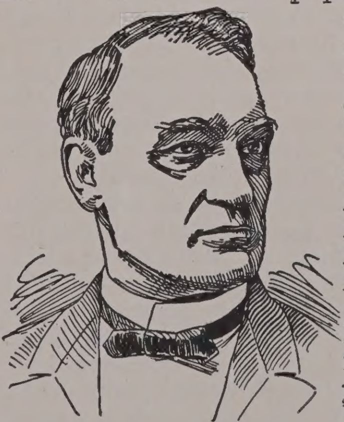
Caribbean Sea (*kăr′ĭb-bē′an*), that part of the Atlantic Ocean lying between Cuba, Santo Domingo and Porto Rico on the north, Venezuela and Colombia on the south, the Lesser Antilles on the east and Central America on the west. It communicates with the Gulf of Mexico through a channel, 120 miles wide, between Cuba and Yucatan. Its navigation is for the most part clear and open. It contains some large gulfs.

Cariboo and Cassiar are two important districts in British Columbia on the north. Placer miners won $50,000,000 of gold from the creeks and benches of these districts years ago. Wealthy companies are now engaged in hydraulic mining on a large scale. Large deposits of gold and silver quartz have been found on Portland Canal. Coal and copper ore are plentiful. These districts are proving to be rich and attractive.

Caribou. See Deer.

Carl′eton, Gen. Sir Guy, Lord Dorchester. This distinguished soldier and statesman was born at Strabane, Ireland, Sept. 3, 1724. He was at the siege of Louisbourg as lieutenant-colonel; wounded, as colonel, at the storming of Quebec; at the siege of Belle Isle and the taking of Havana by the British and American forces in 1762. On Sept. 24, 1766, he was appointed lieutenant-governor of Quebec, succeeding to the governorship on Jan. 10, 1775, when he took command of the British forces in the Canadas, defending Quebec successfully against Montgomery and Arnold during the siege. He captured Crown Point in October, 1776; was commissioned lieutenant-general August, 1777; and took supreme command of the British forces in America Feb. 23, 1782, succeeding Sir Henry Clinton. He arrived in New York on May 5, and was in command at the evacuation on Nov. 25, 1783. He was reappointed governor of Quebec on April 11, 1786, created Lord Dorchester the August following, resigned the post in 1796, and died near Maidenhead Nov. 10, 1808.

Carleton, Will, American author and lecturer, was born at Hudson, Mich., in Oct., 1845, and graduated at Hillsdale College in 1869. Shortly after graduating, he took to journalism and to the writing of ballads of farm and domestic life, which have won him wide popularity. His published verses include *Farm Ballads, Farm Legends, Farm Festivals, City Ballads, Legends and Festivals* (3 vols.), *Rhymes of Our Planet* and *Young Folks' Centennial Rhymes.*



JOHN G. CARLISLE

Carlisle (*kär-lil′*), **John Griffin,** an American politician, was born in Kentucky in 1835. After serving in the legislature and as lieutenant-governor of that state, he was elected to Congress for seven successive terms, and was speaker of the house for three terms. In 1889 he was returned to the United States senate, resigning to become secretary of the treasury under President Cleveland in 1893. He is a forceful debater and one of the most prominent leaders of the Democratic party.

Carlisle', Pa., a borough, the county seat of Cumberland County, on the Cumberland Valley and the Philadelphia & Reading railroad, 17 miles west-southwest of Harrisburg. In the vicinity is Mount Holly, where there are mineral springs of high medicinal value. The borough is the seat of the United States Indian Training and Industrial School, of Dickinson (M. E.) College and of the Metzger Institute for girls. Its industries embrace flour-mills, shoe and carpet-factories, paper-box factories, machine-shops and chain and frog-switch works. Carlisle was founded about the middle of the 18th century, and here, during the Whiskey Rebellion the Pennsylvania and the New Jersey troops were mustered; while during the Civil War the place was shelled by the Confederates. Population, 10,726.

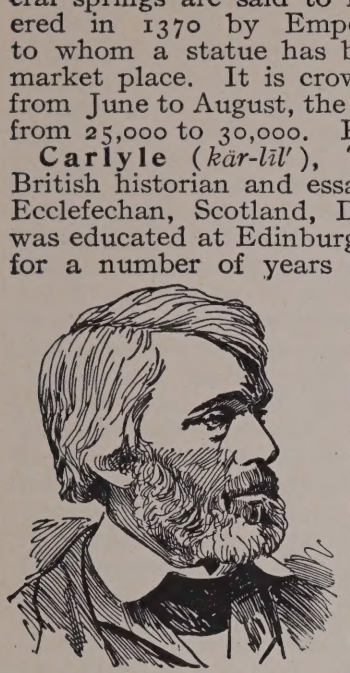
Carlisle Institute, a training school for the higher education of the Indian youth at Carlisle, Pennsylvania, arose out of the undertaking of Captain R. H. Pratt in 1875 to educate 74 Indian prisoners who had been set under his charge at St. Augustine, Florida. At first the education offered was chiefly of an industrial kind. But in 1879 the school was removed to Carlisle, and literary subjects were introduced into the course of instruction. Various trades were taught to the Indians at Carlisle, as at Hampton Institute and the Indian schools of the west. The true name of Carlisle Institute was United States Indian Training and Industrial School. The school was discontinued in 1918. While it existed, it stood for an effort on the part of the government, which made an annual grant for its support, to solve the problem of the future of the Indians in a permanent way. There was an average attendance each year of about 800 students. The government, however, felt that it was unnecessary to continue the school longer, and transferred the students to western schools. Indians are now willing and capable of entering regular public schools and colleges with white students.

Carlists, the name by which are known the supporters of the Spanish pretender Don Carlos, brother of Ferdinand VII, and of later claimants of that branch of the Bourbon family. The name is also applied to the partisans of Charles X of France (1824-30) and his descendants.

Car'los I, King of Portugal from 1889 to 1908, was born on Sept. 28th, 1863, and died by the hand of an assassin on Feb. 1st, 1908. Through his father he was a descendant of John of Braganza, sometimes called John the Restorer, who was proclaimed king in 1640 when Portugal regained independence from Spain. His mother is the daughter of Victor Emmanuel, the first king of modern Italy, and so the Portuguese monarch was a cousin of Italy's present king. He married a daughter of the Orleans claimant to the throne of France, and himself became king on Oct. 18th, 1889. His reign was marked by serious colonial, financial, political and social troubles. Difficulties with England broke out in regard to Anglo-Portuguese boundaries between the adjoining African possessions of the respective powers. In 1891 the national finances became deranged, interest on the debt was scaled, and in 1907 a monopoly in tobacco was created. The so-called political parties had for decades mismanaged the country and robbed its treasury. In 1906-7 the king endeavored to end all financial and governmental difficulties at a single stroke by making the premier practically a dictator, suspending the constitution and inaugurating drastic fiscal reforms. Revolutionary resistance ensued, and resulted in the assassination of the king and the heir-apparent, who were fired upon by a group of conspirators on a street in Lisbon as the king and his family were returning to the palace in a carriage. Personally, Carlos was popular, though his injudicious and not always justifiable methods of removing abuses had recently provoked discontent. Among scientists he was an authority on deep-sea soundings.

Carlovingians (*kär'lō-vĭn'jĭ-anz*), the name of a dynasty, which, during the 8th, 9th and 10th centuries gave sovereigns to Germany, France and Italy. Their origin dates from the beginning of the 7th century, to Arnulf and Pepin of Landen, two Frankish lords; but the name is derived from Charles Martel. His son, Pepin the Short, was the first to take the title of king. Pepin's son, Charlemagne, by virtue of his wide conquests, styled himself emperor, and in the year 800 was crowned by the pope as emperor of the western world. When his empire broke up in 887 into nine separate kingdoms, the most important ones, Germany, France and Italy continued for some years under the sway of the family. They ruled in France till Hugh Capet founded the dynasty called the Capetian; in Germany till the rise of the houses of Franconia and Saxony; and in Italy until Otho the Great united that country to the German empire.

Carlsbad (*kärls'bät*), a town of Bohemia, 70 miles from Prague. Lying in a beautiful narrow valley, between steep granite mountains, it is noted as the most aristocratic watering-place in Europe. Its mineral springs are said to have been discovered in 1370 by Emperor Charles IV, to whom a statue has been raised in the market place. It is crowded with visitors from June to August, the number averaging from 25,000 to 30,000. Population, 12,579.



THOMAS CARLYLE

Carlyle (*kär-līl'*), **Thomas,** a great British historian and essayist, was born at Ecclefechan, Scotland, Dec. 4, 1795. He was educated at Edinburgh University, and for a number of years supported himself by teaching. At the same time he was engaged in literary work and study. He wrote articles for the *Edinburgh Encyclopædia*, the *Edinburgh Review* and various other magazines, making, besides, many translations from the German. *Sartor Resartus* is perhaps Carlyle's most characteristic work. Its fantastic hero, Diogenes Teufelsdröckh, illustrates in his life and opinions what Carlyle calls the Philosophy of Clothes. But the work which established his reputation as a genius of the highest order, and proved him to be, as Goethe said, "a new moral force in the world" was his *French Revolution.* Perhaps the most successful of his works is *Cromwell's Letters and Speeches*, which entirely changed the current opinion regarding that character. The *History of Frederick the Great* is Carlyle's most ambitious work. During a number of years Carlyle lectured on *German Literature*, the *Successive Periods of European Culture*, the *Revolutions of Modern Europe* and *Heroes and Hero-Worship.* He died at the age of 86, Feb. 4, 1881, at his home in Chelsea, London, where he had lived for 40 years. Many honors were offered to Carlyle, most of which he refused; but he accepted the appointment of lord-rector of Edinburgh University. His installation address, *On the Choice of Books*, is a thought-stimulating and instructive work. He was a friend of many of the great men of his day, such as Coleridge, Goethe, John Stuart Mill and Emerson. Carlyle probably exerted a greater influence on British literature during the middle of the 19th century than any man of his time. Although his literary style is peculiar, rough and jerky, yet it is always powerful and often grand. See his life by Froude, his early letters edited by C. E. Norton and the correspondence between Goethe and Carlyle. Carlyle's wife was one of the most accomplished women of her time.

Car'man, Reverend Albert, was born in eastern Ontario in 1833. He is a graduate of Victoria University (Cobourg), and taught for some years. In 1874 he was elected a bishop of the Methodist Church in Canada. After the union of the Methodist bodies in 1833 he became general superintendent of the Methodist Church in Canada, and represented the Methodist Church at the Ecumenical Methodist Conference held at Washington in 1891. As preacher, organizer, teacher and controversialist he has but few equals.

Carman [William] Bliss, one of the leading poets of English-speaking America, was born in Fredericton, N. B., April 15, 1861. He graduated from the University of New Brunswick in 1881, and studied later at Harvard University and the University of Edinburgh. After experimenting with law, engineering and teaching he became an editor of the New York *Independent* in 1890, and has since devoted himself to writing. His poetic writings are voluminous, and include, in addition to the three volumes of *Songs from Vagabondia*, written in collaboration with the late Richard Hovey, *Low Tide on Grand Pré, A Sea-Mark, Behind the Arras, At Michaelmas, Ballads of Lost Haven, By the Aurelian Wall, St. Kavin, The Green Book of the Bards, The Book of Myths, Ode on the Coronation of King Edward, A Winter Holiday, Songs of the Sea-Children, Songs from a Northern Garden.* He is a cousin of Charles G. D. Roberts. Of late Mr. Carman has been writing essays on literary and other topics, several volumes of which have appeared in book form. In him speaks the voice of the Canadian forests and sea coasts, and more than one of his poems gives promise of immortality.

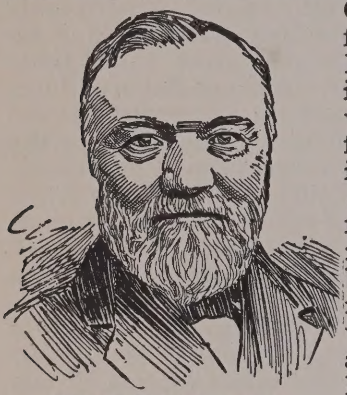
Carmel (*kär'mĕl*), meaning woodland or garden land, is the name of a range of hills in the northwest of Palestine, ending at the sea in the promontory of Mt. Carmel. The average height is 1,500 feet above the sea, and the highest elevation is 1,750 feet. Carmel was the scene of some of the great events of Bible history. It was the retreat of the prophets Elijah and Elisha. The brook Kishon flows at its base. A convent is now situated on the mountain, where travelers are entertained. A German colony has settled near the foot of the mount and on its sides.

Carmichael, The Right Reverend James, Bishop of Montreal, born in Dublin, came to Canada, and was ordained in 1859. He became assistant minister of St. George's, Montreal, in 1868, and remained there ten years. He was rector of the Church of the Ascension in Hamilton for some years, but returned to St. George's, Montreal, as rector in 1882, and was appointed Dean of Montreal in 1883. He is president of the Natural History Society of Montreal. He has published several volumes, and is one of the ablest preachers and lecturers in

Canada, held in highest esteem by all the churches.

Carna′tion, a beautiful and fragrant double-flowering variety of the clove-pink. It is a universal favorite of florists, and exists only in a state of cultivation. The flower is often three inches in diameter, and the prevailing colors are white, scarlet and pink. The carnation prefers a rich soil and should have plenty of fresh air.

Carnegie (*kăr-nā′-gĭ*), **Andrew,** the Scoto-American steel-manufacturer and philanthropist, was born at Dunfermline, Scotland, Nov. 25, 1835. His father was a weaver, who, with his family, emigrated in 1848 to the United States. Beginning life with only a limited school education, young Carnegie worked at first in various humble positions in Pittsburg, Pa., where he at length found employment in a telegraph office and obtained a footing in the railroad world. The basis of the immense fortune he was afterward to amass was due to his connection with iron-works, which he established at Pittsburg, and which subsequently developed into the vast industry of the Carnegie Steel Company, located at Homestead and elsewhere in and about Pittsburg. The Carnegie Company, in February, 1901, was, with a number of other manufacturing concerns, incorporated as the U. S. Steel Corporation (q. v.), having a total capitalization of one billion one hundred million dollars. In achieving success, he was at a critical period in life aided by making the acquaintance of Mr. Woodruff, inventor of the railway sleeping-car, and by being one of a fortunate oil-syndicate. The story of Mr. Carnegie's career and the vast wealth he has amassed reads like a romance; and, to his honor be it said, he made a noble use of his princely fortunes. For over 30 years he devoted large sums of money to benevolent objects and especially to the founding and endowing of public libraries, notably $500,000 for a library in Pittsburgh, and $250,000 for a library in Edinburgh, Scotland, and $5,200,000 to erect and equip 80 public libraries in New York City. It is calculated that Mr. Carnegie spent in all more than sixty million dollars on over 2,000 libraries, which he was instrumental either in founding or aiding. Besides, he donated ten million dollars towards the founding at Pittsburgh of Carnegie Institute and fifteen millions for creating the Carnegie Foundation, a trust fund to provide annuities for college professors in the United States, Canada and Newfoundland, who from old age or other physical disability have retired from active service.



ANDREW CARNEGIE

He signalized his retirement from active business in 1901 by gifts of $5,000,000 for the benefit of his old employes. He donated to five Scotish universities the sum of ten million dollars, and twenty-five million dollars to found a university at Washington, D. C., which is to be under the supervision of the national government. He also donated over ten million dollars for those dependent on persons losing their lives in saving life or for the heroes themselves if they are only injured. Mr. Carnegie was the author of the following publications: *Round the World, Triumphant Democracy, The Gospel of Wealth,* a *Life of James Watt, The Empire of Business, An American Four-in-Hand in Britain,* and *Problems of Today,* together with many articles contributed to the magazines and reviews of the day. Mr. Carnegie also contributed largely to endowing, both in this country and in Great Britain, educational institutions and the equipping of hospitals. He also provided funds for the permanent building erected at The Hague (*q. v.*) for the international court of arbitration. He died August 11, 1919.

Carnegie Institution, founded and endowed by Andrew Carnegie at Washington, D. C., in 1902, to encourage research, assist investigation and give aid in the promotion of discovery in the arts and sciences, as well as to help in laboratory work and assist meritorious persons and institutions in all departments of investigation and research, besides promoting the publication and dissemination of the results of the same. The institution, which was endowed by its founder with gifts aggregating $25,000,000, is managed by a board of twenty-four trustees, who meet annually, and by an executive committee acting in concert with the president. Its further design is to increase the facilities of higher education, giving aid to universities, learned bodies, scientists and experts in all important fields of research, investigation and meritorious practical work, and to provide buildings, libraries, laboratories and apparatus.

Carnegie Libraries. In 1891 Andrew Carnegie wrote in *The North American Review* as follows: "The result of my own study of the question: What is the best gift that can be given a community? is that a free library occupies the first place, provided that the community will accept and provide for it as a public institution, as much a part of the city property as the public schools, and indeed an adjunct to those. Closely allied to the library and, when possible, attached to it, there should be rooms for an art-gallery and museum and a hall for such lectures and instruction as are provided in the Cooper Union (New York City.)" This conclusion is largely the fruit of Carnegie's own experience; for as a poor boy he benefited largely by some books that a kind friend lent him. His policy after the above was written was not changed. A standing offer of a free library is open to any town in the United States or Great Britain, provided that the town will guarantee a certain annual sum, usually 10 per cent. of the amount donated, in support of the library. New York City alone has received over $5,000,000 for such libraries. In Pittsburg the library is rather overshadowed by the allied institutions for instruction, which make up the Carnegie Institute. About $10,000,000 is the amount of Carnegie's contribution to this. St. Louis has received $1,000,000, Detroit $750,000. But it is impossible to mention all the libraries that have been established by Carnegie in this country and Great Britain. His estimate of the value of libraries, quoted above, is emphasized by the fact that so large a proportion of his gifts have gone to helping them.

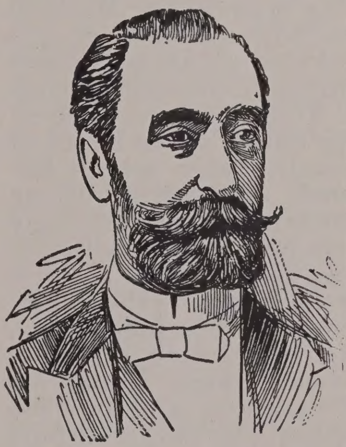
A significant remark of Mr. Carnegie, in this connection, is that when he was a boy he was so busy reading the books that interested him that he had no time for the wasteful and injurious habits acquired by idle boys.

Car′nival, a festival which originally began on the day after the feast of Epiphany and lasted till midnight on Shrove Tuesday; that is, from January 6 till Lent. In later times it was limited to from three to eight days before Ash Wednesday. The forms and customs of the carnival come from the old heathen festivals of the springtime. Banquets of rich meats and drinking bouts were its chief attractions during the middle ages. The chief days had distinct names, as fat or greasy Sunday, blue Monday, etc. In Germany the carnival is celebrated in the cities of the Rhine provinces and is also being revived in the north. The celebration is usually confined to the wearing of masks, to processions in costume and masked balls. In the south of France and throughout Italy, especially in the cities, it is still a popular festival. Venice used to be noted for the splendor of its carnivals; that of Rome was long the most noted yearly revel in the southern cities of Europe. Here races of riderless horses along the crowded Corso, the throwing of flowers and plaster confections from the windows and balconies on the people in the carriages and cars in the streets and a return fire from below were among the chief features and frolics of the celebration. In recent years the Roman carnival has practically ceased.

Carniv′orous Plants, certain seed-plants which have developed the habit of capturing insects and using them for food. They live usually in swampy regions, and are able to capture insects in various ways, and then digest them and absorb the nutritious substances. The commoner forms are as follows: The pitcher plants, belonging to the genus *Sarracenia*, are common in swampy ground both north and south. The leaves are shaped like slender hollow cones and rise in tufts from the ground, the cone containing water, and its mouth being more or less overarched by a hood. A sweetish substance is secreted about the rim, and attracts the insects, which fall into the cone and are drowned. Such pitchers are often found more or less filled with the decaying remains of captured insects. In California a huge pitcher plant, *Darlingtonia* by name, has leaves sometimes three feet high. The best known tropical forms belong to the genus *Nepenthes* and its allies, in which the urns swing from the tendrils developed at the ends of the leaves. Various forms of *Nepenthes* are common in greenhouses. Another group of carnivorous plants is the group of sundews, belonging to the genus *Drosera.* They also grow in swampy ground and have rosettes of basal leaves, which are beset by sensitive glandular hairs. Small insects coming in contact with a sticky gland are held fast, and the leaf closes over the struggling victim and digests it. Perhaps the most remarkable carnivorous plant is *Dionæa* or Venus' fly-trap, which is found only in sandy savannas near Wilmington, N. C. The leaf blade is constructed like a steel trap, and the two halves snap together whenever any of the bristles are touched by an insect. In this way the insect is caught and gradually digested.

John M. Coulter.

Carnot (*kär′nō′*), **Marie François Sadi,** a French statesman, was born at Limoges, in 1837. Entering politics, he became a leader of the strict republicans. He was elected a member of the national assembly and later of the chamber of deputies, and was minister of public works and finance. In 1887 he became president of France. He was assassinated at Lyons, June 24, 1894.



M. FRANCOIS SADI CARNOT

Carnot (*kär′nō′*), **Nicolas Leonard Sadi,** a distinguished French engineer and physicist, born at Paris, June 1, 1796; died Aug. 24, 1832. In his memoir on the *Motive Power of Heat* he investigated the problem of using heat to do work in an engine, and he first showed under what conditions the heat may be most economically used. This result, which is embodied in a law known as *Carnot's Theorem*, is one of the foundation-stones of the science of thermodynamics. (See Magie's translation of Carnot's paper in Harper's *Scientific Memoirs*).

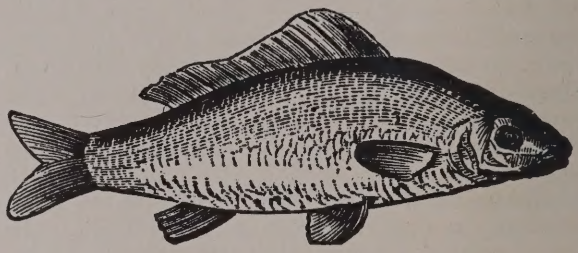
Carob (*kăr'ŏb*) or locust tree, a native of the Mediterranean countries. In size and manner of growth it is somewhat like the apple tree, but has dark, evergreen leaves. The fruit is a brown, leathery pod, four to eight inches long, containing fleshy and, at the last, spongy and mealy pulp of an agreeable, sweet taste, in which lie a number of brown seeds, like flattened beans. The sweet pulp makes the pods an important article of food to the poorer classes. They are also used as food for horses and cattle. They are sometimes called St. John's bread, in allusion to the tradition that they are the locusts which formed the food of John the Baptist in the wilderness. They are also thought to be the husks in the parable of the Prodigal Son. Some carob trees yield 800 or 900 pounds of pods. A preserve and a kind of sugar are sometimes made from the pulp. The carob is not the same as the American locust.

Carol I, King of Rumania, was born in Germany, April 20, 1839, the son of Prince Carl of Hohenzollern. In 1866, he was chosen prince of Rumania, then a dependency of Turkey. In 1881 he declared Rumania independent and became king. His nephew Ferdinand succeeded him on his death October 10, 1914.

Car'oline Islands, a group of about 500 coral islets, which form part of the German New Guinea protectorate, in the western Pacific, lying between the Marshall and Pelew Islands, with an area of 270 square miles. The Pelew group, sometimes included in the Caroline Archipelego, covers 560 square miles. Three quarters both of the area and the population are to be found in five volcanic islands, which are all fertile and well watered. The people belong to the brown Polynesian stock, are strongly built, and are amiable, gentle and intelligent. They are bold sailors and carry on a thriving trade with the Ladrones to the north, where they have several settlements. Copra, the dried kernel of the cocoanut, is largely exported. The islands were discovered in 1527 by the Portuguese, and in 1866 were annexed to Spain. In 1885 a dispute arose over the islands between Spain and Germany, which was referred to the pope for decision. He decided in favor of Spain, but gave Germany special trade privileges. In 1899 Germany secured the group by purchase from Spain. For administrative purposes the islands are divided into three groups: the Eastern Carolines, with Ponape as the seat of government; the Western Carolines and the Pelew Islands, with Yap as administrative center; and the Marianne or Ladrone Islands, of which Saipan will be the future seat of government. The population is mainly of Malay origin, with some Japs and Chinese and about 900 whites. The northern group of the islands, being volcanic, is for the most part uninhabited. In 1898 one of this group of islands, Guam, was ceded to the United States.

Caroline of Brunswick (1768–1821), queen of George IV of England, whom she married in 1795, as Prince of Wales and before that monarch came to the throne. In 1796 she gave birth to the Princess Charlotte, and after this event the prince separated from her; and when in 1820 he became king, he refused to permit her to share the throne as his queen. To induce her to yield, she was offered 50,000 pounds sterling a year if she would leave England; but this she indignantly refused. As the English generally took her side and thought her an ill-treated wife, the government was ill-advised enough to institute proceedings against her for unchastity. This gave Lord Brougham, while yet at the bar, the opportunity of making an eloquent defense of her cause, which forced the government to abandon its divorce bill which it had lobbied through the house of lords. She died a fortnight after she had been refused admittance at Westminster, on the coronation day of her husband.

Carp, a common widely distributed food-fish. The carp family is the largest family of fishes, and embraces, as relatives of the carp proper, the chub, dace, shiners, goldfish, etc. The carp is a hardy, sluggish fish, often bred in artificial ponds. It eats water-insects and other small aquatic animals and also leaves of water-plants. It is preyed upon by kingfishers, turtles and crayfishes; while a number of fish feed upon its eggs and young.



CARP

Carpaccio, Vittore (*vē-tō'rā kär-pä'chō*), an Italian artist, was born about 1450 and died in 1525. All that is known of him is that Istria was his birthplace and Venice his home. He belonged to its old school of painters, being one of the most celebrated masters and a rival of Bellini, and put Venice into the backgrounds of his pictures. He excelled as an architectural and landscape painter, but preferred to paint sacred subjects dramatically. His histories of Saints Stephen and Ursula are his most celebrated paintings. He was vivid in imagination, natural in expression and correct in arrangement, and employed a great variety of figures and costumes. Benedetto, his son, lived about 1550, and painted a fine *Coronation of the Virgin.*

Carpathian (*kär-pā'thĭ-an*) **Mountains,** the second great range of central Europe, extend in a great semicircle over a space of 880 miles from Presburg on the Danube to Orsova on the same river. They lie almost entirely within the former Austrian dominions, in two great masses: one in Hungary, which abounds in minerals; and one in Transylvania, whose highest peak, Negoi, is 8,343 feet high. Between the peaks are lower ranges of wooded mountains. Forests, steep precipices, narrow ravines and extinct craters combine to make the Carpathians a magnificent spectacle. The mines of Schemnitz in the Hungarian range are celebrated.

Car'pel. The innermost structure of the flower, which contains the ovules. A flower may have one or more carpels which remain separate from one another or unite to form a single pistil. See FLOWER.

Car'penter, William Benjamin (born 1813, died 1885), an English medical man and great writer on physiology, was born in Exeter, and after studying medicine devoted himself to scientific study and investigation. He was appointed at different times lecturer and professor at various institutions, and edited a medical review and a *Popular Cyclopædia of Science.* He made three voyages to the North Atlantic and Mediterranean to make explorations in the deep sea, in the study of biology. In 1882 he lectured in the United States. His work and writings have done much for science. Among his publications may be mentioned *Zoology and the Instincts of Animals, The Microscope and its Revelations,* a work on *Comparative Physiology* and *The Principles of Mental Physiology.*

Carpet, a covering for floors, usually manufactured principally, of wool. Carpets of some sort date back to very early times. They were in use in ancient Greece and Italy and probably in Egypt. Among the most famous carpets are those of Persia. Even among the higher classes there, carpets form nearly all the furniture of a room, and a Persian not only sits and sleeps upon a carpet, but makes a table of one. Fine Persian carpets are highly prized for their beautiful designs and the quiet harmony of their colors. Small pieces of old Persian carpets recently sold in Paris for over $5,000 apiece. Indian carpets and Turkey carpets are well known varieties. A few Turkish and imitation Persian carpets are made in Adrianople. The Scotch carpet is the oldest kind of machine-made carpet. The Brussels is a famous European make. In this carpet the worsted threads are interwoven into a network of linen. It is woven on a loom with an apparatus which, at each throw of the shuttle, raises such of the colored yarns to the surface as the pattern requires. Velvet, tapestry and jute carpets are also much used. Great Britain is the great center of the world's carpet making, including the well known Brussels, Wilton, Kidderminster and Axminster varieties. In the United States carpet-manufacture has also become an important industry, and many of the most valuable improvements are the result of American inventive genius. There are in the United States about 400 carpet-factories, which annually produce about 75,000,000 yards of carpeting, valued at over $60,000,000. Philadelphia is the most important seat of the industry in the United States. Associated with the trade in carpets and pile-fabrics is that in rugs and tapestry. The latter was early known to the Greeks, and had been carried to a high state of perfection at Athens, but it is usually associated with the Flemish weavers of Arras during the 15th and 16th centuries. It was introduced into England by Wm. Sheldon, in Henry VIII's reign, and into Paris by Henri IV about 1606, the Gobelin tapestry being due to Louis XIV. The Bayeux tapestry is simply a roll of linen-cloth worked with colored thread.

Carpet-Baggers. After the Civil War the southern states fell largely into the hands of the negroes, who had just received the right to vote. To take advantage of their ignorance many politicians of low principles came down from the north, and became citizens of such states and then leaders of the negro voters. They were called carpet-baggers because many of them had no property interest in the southern states, and came down with nothing but what they could carry in a carpet-bag. These men, having got into office and power, proceeded to rob the southern states and to humiliate the southern whites. In many cases they laid a burden of debt and of unwise legislation upon those states.

Carpet-Beetle, a small beetle, the larva of which is very destructive to carpets, woolen clothing, furs and feathers. It has attracted wide attention in recent years on account of its injury, especially to carpets. The larva is about one fifth of an inch long, and covered with dark brown hairs. It is frequently called buffalo-moth. The perfect insect is a small black, white and red beetle, about one seventh of an inch long, feeding on the pollen of flowers—often on currant bushes. They enter houses in the spring to lay their eggs. The best way to avoid this pest is to use rugs instead of carpets and trap the larvæ by woolen cloths on the floors of closets.

Carpet-Sweeper, a familiar and useful device in the economics of the household for brushing carpets and rugs with ease, efficiency and the absence of dust. It consists of a revolving brush enclosed in a wooden and metal box, and is put in mechanical operation by pushing the attached long handle back and forth on the carpet, the revolving brush gathering up the dust and confining it, until emptied, in the receptacle which forms part of the machine.

Car'pogo'nium (in plants), the peculiar female organ of the red algæ. See RHODOPHYCEÆ.

Carrara (*kär-rä'rȧ*), a town of Italy, about sixty miles northwest of Florence, lies in a deep valley of the Apennines near the sea. It is famous for its marble quarries, which have been worked since the days of the Romans. Its port is Avenza, at a distance of some three miles. The value of the marble of Carrara lies not only in its beauty but in its durability and smoothness when polished. No stone is so much in demand for the art of the sculptor. Each year sees an output of over 100,000 tons of Carrara marble; and, if we include those who saw and polish the stone for export, the quarries afford employment to about six thousand men.

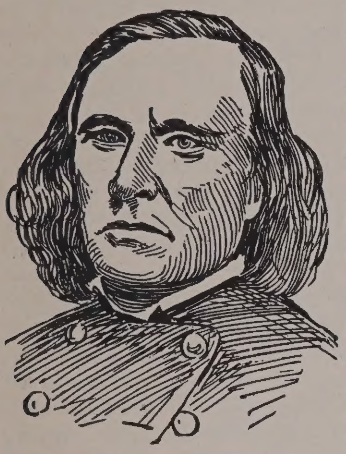
Car'riage, a general name for any vehicle used to carry passengers, either on roads or railroads. It is mounted on two or more wheels and varies in form and build. The earliest carriages were made for war, but as far back as the time of Joseph carriages were used also for royal pageants. Among the Greeks chariot-races formed an important part of the Olympic games; the Romans had two, three and even four-horse chariots; and the Scythians are said to have had a covered chariot, the top of which could be removed and used as a tent. The earliest record of the carriage of modern times belongs to about the year 1280, when Charles of Anjou entered Naples with his queen, riding in a caretta, a small decorated car. But it was considered an effeminate habit to use carriages, and Queen Elizabeth reigned seven years before she had a coach. The boatmen and the owners and bearers of sedan chairs bitterly opposed them. The early carriages were heavy. lumbering affairs, without springs. Early in the 18th century leather straps were used to suspend the body of the coach, and in 1804 the oval springs, now so common, were invented by an Englishman. Since then the improvements in carriages have been numerous. There are many sorts of carriages; of two-wheeled vehicles are the gig, dog-cart, hansom-cab, etc.; of four-wheeled open carriages are the phaeton, wagonette, etc.; the coach and omnibus are examples of closed carriages. The barouche can be opened or closed at will. Most European forms are used and have been improved in the United States, but there also are several distinctly American vehicles: the rockaway, the sulky, the buckboard and the light American buggy. In Japan and other eastern countries, the jinrikisha is used, which is a two-wheeled light cart pulled by a man. For railroad-cars see RAILROAD.

Carrier, Common, in law and commerce a company or individual trader who engage for hire to carry merchandize, freight or miscellaneous articles, and transport and deliver such to a given address or designated town or place. In law, he is bound to use reasonable expedition and care in the delivery of what is entrusted to him, and, so far as he can, to protect such from damage or mishap by the way, as well as from the result of negligence, and this whether it be by land or by water. Unless specially stipulated and agreed to, the carrier is not bound to carry articles of a dangerous character, involving risks in their cartage and transportation; nor is he usually held liable for perishable goods save where undue delay has occurred in transmitting them. In the case of railroad and steamboat companies transporting passengers from place to place, the law requires of them that they shall use all care and reasonable expedition in conducting the traffic. The liability of passenger carriers for baggage committed to their charge is also deemed the same as that of common carriers and forwarders of general merchandise.

Carrier-Pigeon, one of the more notable of the extensive varieties of pigeons or doves of the domestic breed, trained to convey letters or despatches from distant places, and often from a vessel far at sea, to its home. These bird-messengers to-day in use are known as homing-pigeons, many of them being made to accompany armies in the field (as in the Franco-Prussian War), whence they are despatched with messages to their homes, sometimes as far distant as 200, 300 and even 500 miles off. Their use in this respect is an old one, dating back even to the era of the first crusade (1100), when pigeon-posts were utilized by the Saracens for the transmission of information as to where they were and how it fared with them in engagements with the enemy. The carrier-pigeon is a bird of about 15 inches in length, markedly carunculated about the beak and eyes and with wings extending almost to the tip of the tail. Their intelligence is great, and their flight is straight and rapid, though, as a rule, not exceeding 30 or 40 miles an hour, In long flights they are liable to attacks from enemies; while thick, foggy weather is a distinct disadvantage to them.

Car'roll, Charles, of Carrollton, (1737-1832), American patriot, one of the 56 signers of the Declaration of Independence, was born at Annapolis, Md., of Irish descent, and educated in Europe, chiefly in the Jesuit colleges in France. An inheritor of large wealth and heir to old manorial estates in Maryland, the youth returned to this country and soon espoused the cause of the colonies against the British crown and stoutly opposed arbitrary taxation. When the Revolutionary War came, it found him a member of the Continental Congress, and with others, including Benjamin Franklin, he was despatched to Canada to endeavor to get that colony to break with the mothe country and join those to the south of the line in seeking independence. Failing in his mission, he became a member of the Maryland constitutional convention and later one of its senate. From 1789 to 1791 he was a member of the federal senate and also served on the Maryland and Virginia boundary commission. In 1828 he laid the cornerstone of the Baltimore and Ohio Railway, and four years later died at Baltimore in his 95th year. His life and journals have been published.

Carson, Christopher, popularly known as Kit Carson, a famous American trapper and guide, was born in Kentucky in 1809. While yet a youth his family moved to Missouri, and he early engaged in trapping. He spent eight years as hunter to Bent's fort, and then acted as guide in the explorations of General Frémont. One of his most difficult feats was the driving of 6,500 sheep to California. He became Indian agent in New Mexico, and helped to bring about many treaties with the Indians. During the Civil War he did good service, and at its close was breveted brigadier-general. He died at Fort Lynn, Col., in 1868.


KIT CARSON

Carson City, Nev., the seat of Ormsby County and the capital of the state, is on the Virginia & Truckee Railway, 12 miles east of Lake Tahoe at the foot of the Sierra Nevada and 30 miles south of Reno. It lies in a fertile region, its chief industries being mining, lumbering and agricultural operations. Besides its gold and silver mines (and here is the noted Comstock Lode), there are hot springs in the region. Settled in 1858, the town became the capital three years later, while in 1875 it received its charter as a city. Within the city are the state and federal buildings, including a branch mint, and in the neighborhood are a U. S. government Indian School and the state prison. Its population, which has declined of recent years, is now but 2,466.

Cartagena (*kär'tȧ-jē'nȧ*), **Spain,** an important historic town and fine seaport on the Mediterranean, in the province of Murcia, is situated in the southeast of the kingdom, south of Alicante and east of Almeria in Andalusia. Its population in 1910 was 96,983. Its harbor, which is defended by strong fortifications, is one of the best on the coast and was formerly the chief naval arsenal of Spain. In early days it was the great commercial emporium of the Carthaginians, and was founded in 242 B. C. by Hasdrubal. Thirty-two years later, it was captured by Scipio Africanus and in A. D. 550 it was destroyed by the Goths; it has otherwise suffered from invasion and capture at different eras. Today the city, which is an episcopal see, has many interesting ruins, among them the Castillo de la Concepcion, situated on a fine promontory, while notable are many of its churches (especially the cathedral, a Gothic structure which dates from the 13th century). The arsenal, docks, dockyards, barracks and hospitals, besides its foundries, machine shops, glass and smelting works and other industrial establishments, are worthy of a visit. Its exports consist of minerals, including lead, zinc, copper, silver ore, coke and coal; besides machinery, lumber, esparto grass, oranges, lemons.

Carteret (*kär'tĕr-ĕt*), **Sir George,** an English vice-admiral, royal lieutenant-governor of the island of Jersey in the English Channel and one of the original proprietors of the land lying between the Hudson and the Delaware, afterward named in his honor New Jersey, was born on Jersey about 1612 and died in 1680. With Lord Berkeley, a favorite of Charles the Second's court, Carteret was granted by the Duke of York (afterward James II), portions of New Amsterdam and what is now New Jersey. On the latter Carteret settled a colony, which should enjoy religious freedom and a liberal government resembling that of Maryland. The relations between the colonists and Carteret were, nevertheless, not harmonious; and portions of the lands were made over to the Quakers, ultimately, however, to revert again to the crown until the War of the Revolution.

Car'thage (*kär'thāj*), a city on the northern coast of Africa, the capital of one of the great empires of the ancient world. It stood on a peninsula of the region that is now Tunis, and was founded, probably, about the middle of the 9th century B. C. by Phœnicians from Tyre or from the Tyrian colony of Utica. The Carthaginians belonged to the Semitic race, and were an offshoot from the Canaanites. Vergil in his *Æneid* relates a mythical story of the unfortunate Queen Dido and the young city, but little is really known of the city's rise to power and wealth. About the 6th century it appears as the center of a great commerce and the capital of wide dominions in Africa, Sardinia, Sicily, Corsica and probably Malta. In 525 B. C. Carthage narrowly escaped destruction at the hands of Cambyses, the Persian king, and in 509 B. C. occurred her first treaty with the rising power of Rome. About this time began the contest between the Carthaginians and the Greeks for the possession of Sicily. Greece had settled a large part of that island with her colonies, and while she was engaged in her struggle with Persia, Carthage resolved to wrest Sicily from her grasp. The first expedition was utterly cut to pieces on the same day that the battle of Salamis was fought. The war was carried on for 250 years, with long intervals of inaction and with varying success; but in 276 B. C., when the struggle closed, Carthage was strongly established in the island. But a new enemy now appeared to contest with Carthage the sovereignty of the Mediterranean, in the growing power of Rome. In 264 B. C. began the famous Punic wars. By the close of the first of these wars, in 241 B. C., Carthage had lost Sicily; but her general, Hamilcar, and his son-in-law, Hasdrubal, built up a new power in Spain, and at their death, Hannibal, the son of Hamilcar, one of the greatest generals the world has ever seen, found himself able to renew the struggle. In 219 B. C. broke out the second Punic War. Hannibal issued from Spain, crossed the Alps, descended into Italy, and, in battle after battle, with inferior forces routed the best soldiers of the ancient world. He brought Rome to the verge of ruin, but he was not supported by his own people. As Arnold the historian has said, it was the war of a man with a nation. After fifteen years in Italy Hannibal was recalled to defend his own city, and in 202 B. C. he was defeated in the battle of Zama by Scipio. Peace was concluded and the power of Carthage was broken. But Rome was resolved on the destruction of the city, and on a slight pretext declared war in 149 B. C. Three years later the third Punic War closed with the fall of the city after a siege of two years. For six days, however, the fighting went on in the streets, men and women defending their homes with fierce despair, contesting every foot of the ground. The city was, nevertheless, razed to the ground, and the country became a Roman province. Carthage became, later on, one of the chief cities of the Roman empire. In the 5th century A. D. it became the capital of the Vandal kingdom of Africa, and it was destroyed at the end of the 7th century by the Arabs. Like other Canaanites, the Carthaginians practiced a horrible form of fire-worship, human victims being offered to their chief god, Moloch. No Carthaginian art or literature remains, if, indeed, there ever existed any worthy of the name. The government was carried on by two chief magistrates and a senate of the leading families, and also by an assembly of the people, which, however, had little power. Their armies were generally made up, in large measure, of hired troops. The Carthaginians were a great trading people. Their ships sailed as far west as the Azores and as far north as Britain and the Baltic. There was in that day an immense trade with the interior of Africa as well as with the Gallic tribes. At the time of the siege of Carthage by the Romans the city is said to have had 700,000 inhabitants. See DIDO, HANNIBAL and ROME.

Carthage, Mo., a city, the county seat of Jasper County, on Spring River and on the Mo. Pacific, the St. Louis & San Francisco and White River R. R's; 54 miles west of Springfield and 150 miles southeast of Kansas City. Mines of lead, zinc and cobalt and quarries of marble and limestone are worked in the vicinity; its other industries, which are flourishing, embrace the manufacture of shoes, bed-springs and plows, besides its foundries and flour mills. Many public buildings, including a courthouse, library, churches and schools add very greatly to the attractions of this progressive city; it also has two fine parks. The town was destroyed in the Civil War, but soon afterwards rebuilt. Near the city an engagement occurred between a Union force under General Sigel and a force of Confederates under Generals Jackson and Price. The result was indecisive. Population, 12,000.

Cartier (*kär'tyā'*), **Sir George Etienne,** Canadian statesman and leader of the French-Canadian Conservatives in the Dominion parliament, was born in 1814, and died in England, May 20, 1873. He was descended from the great navigator, Jacques Cartier. As a young man he took part in the rebellion of 1837, and had to leave the country for a while. Ten years later, after an amnesty had been issued, he entered Parliament, and in 1856 he became attorney-general for Lower Canada. From 1858 to 1862 he was premier; and in 1867, as a member of the Macdonald administration, he took an active part in bringing about Canadian confederation under the British North America Act of that year. He was made a baronet by the crown in 1868.

Cartier, Jacques, a French navigator, was born at St. Malo in Brittany in 1494. He was intrusted by Francis I with the command of an expedition to explore the western hemisphere, and, setting sail in April, 1534, touched on the coast of Newfoundland and discovered the mainland of Canada, which he claimed for France by erecting a wooden cross. The next year he sailed up the St. Lawrence as far as the Indian village of Hochelaga, to which he gave the name of Mont Royal, the site of the modern Montreal. In a third voyage, in 1541, he built a fort named Charlesbourg near the present site of Quebec. Whether he made any more voyages is uncertain, and the date of his death is not definitely known, though supposed to have occurred in 1557.

Cart'ilage. See GRISTLE.

Cart'wright, Edmund (lived from 1743 to 1823), the inventor of the power-loom, was born in England, and until the age of 40 devoted himself to the ministry. In 1784 he happened to talk with some men from Manchester on the subject of mechanical weaving, and, although he had never taken any interest in mechanics, he set to work, and by April of the following year he had his first power-loom in running order. The invention was opposed both by spinners and their workmen, and the first factory was burned down. But improvements were added, and it finally made its way. Cartwright spent the remainder of his life in experiments in the use of steam-power in boats and carriages, but died without reaching any result. For his invention Parliament voted him $50,000.

Cart'wright, Peter, the "Backwoods Preacher," was born in Amherst County, Va., in 1785. His family moved early to Kentucky, and when about 16 he became interested in religion. For many years he preached to the backwoodsmen, and his simble, forcible and earnest words made a deep impression. In 1812 he was made a presiding elder, and spent over 65 years in different western conferences. He traveled 11 circuits and 12 presiding-elder's districts; received more than 10,000 members into the church; baptized more than 12,000 persons; and preached in all about 15,000 sermons. His story is told in his *Fifty Years a Presiding Elder* and the *Autobiography of Peter Cartwright the Backwoods Preacher.* He died in Illinois in 1872.

Cartwright, Rt. Hon. Sir Richard John, P. C. (Great Britain), G. C.M.G., K.C,. M.G., was born at Kingston, Ont., Dec. 14, 1835, the son of the late Rev. R. D. Cartwright, chaplain to the forces, and was educated at Trinity College, Dublin. He has been in the parliament of old Canada and that of the Dominion almost continuously since 1863, was finance minister from 1873 to 1878, chief financial critic and one of the Opposition leaders from 1879 to 1896, acting premier and leader of the house of commons in 1897 and minister of trade and commerce of the Dominion in the Laurier cabinet. In 1897 he went to Washington for the promotion of better relations between Canada and the United States, proposed a joint commission, and served on the Anglo-American Joint High commission at Quebec in 1898 and in Washington in 1898-9. He died Sept. 23, 1912.

Caruso, Enrico. Born at Naples, Italy, in 1872. The son of a mechanic, and, as a boy, working for two *lire* (40 cents) a day. With later years he developed a vibrant and expressive voice which led to his debut on the operatic stage in 1896. He appeared at the Metropolitan Opera House in New York City in November, 1903, and at later dates, and sang often in South America, Russia and England. He was decorated by the kings of Italy and Portugal. He died Aug. 2, 1921 at Naples.

Ca'ry, Alice and Phœbe, American authors, were born near Cincinnati in 1820 and 1824, respectively. Though receiving only a slight education, they early began to write. The poems of Alice and Phœbe Cary showed much poetic power. The two sisters removed to New York in 1852. Alice became a constant contributor to the leading magazines, and also wrote novels and poetry, which subsequently appeared in book-form. The writings of Phœbe consist mainly of poems. Both sisters died in 1871.

Casas (*läs kä'säs*), **Bartolomé de las,** bishop of Chiapa in Mexico, called the Apostle of the Indians, was born at Seville, Spain, in 1474. He studied at Salamanca, and with his father set out on the third voyage of Columbus, and in 1502 accompanied Nicholas de Ovando to Hispaniola. In 1511, having the year before entered the priesthood, he was sent to Cuba to help to pacify the island, and for his services he received an allotment of Indians as slaves. But soon sympathy for them in their piteous condition moved him to go to Spain and ask for a commission to investigate into their condition. He further sought that negro slaves be imported to take the place of the Indians in the heavier work and thus prevent their total extermination. He also attempted to take out Castilian peasants as colonists, but, failing in this, he retired to a Dominican convent in Hispaniola to spend eight years in solitude and study. In 1530 he again visited Spain, and after four years of missionary work in Mexico, Nicaragua, Peru and Guatemala he returned to spend four more years in the hope of gaining his purpose. During this period he wrote *Veynte Razones* (Twenty Reasons) and *Brevissima Relacion de la Destruycion de las Indias*, which has been translated into all European languages. He was offered the bishopric of Cuzco, but preferred the poor one of Chiapa, and arrived at Ciudad Real, its chief city, in 1544. Here he persisted in his campaign against the allotments of Indians, but the revocation of the new laws by Charles V caused him to resign in 1547. In 1550 he argued before a junta against Sepulveda, who advanced the right to carry on war against the Indians, and in 1555 he prevailed upon Philip II not to sell the reversionary rights of the allotments. The restoration of the court of justice to the native Guatemalans was the last act before his death, which occurred in a convent at Madrid, July, 1566, at the age of 92. See *Life* by Sir Arthur Helps

Cascade (*kăs-kād*) **Range,** a range of mountains in the western part of Washington and Oregon and British Columbia, forming a continuation of the Sierra Nevada of California. It runs nearly north and south at an average distance of about 100 miles from the seacoast. The chain throughout most of its course is heavily wooded; but its chief feature is the presence of beautiful cone-shaped and perpetually snow-clad peaks on parts of the range. There are many traces of volcanoes, and volcanic action is not quite extinct in the region of Washington. The main peaks are Mounts Tacoma (14,444 feet), St. Helen's (12,000 feet), Baker (10,700 feet), Hood (11,225 feet), Jefferson (10,200 feet) and Pitt (9,818 feet). The Cascade Mountains, geologists state, are of much more recent formation than the Rocky Mountains proper.

Cascade Tunnel, a great engineering feat on the line of the Great Northern Railway which was undertaken and accomplished between 1897 and 1900 after studendous labor and monetary outlay. It pierces at a high elevation the Cascade Range of the Rocky Mountains, and is in length about 2¾ miles or, with its extended shed at either end, nearly 14,500 feet. The difficulties of the task were vast, chiefly by reason of the large boulders and mass of water-impregnated gravel met with in its construction, necessitating the employment of extra concentric sets of timbers in its building and for permanent support and safety. The tunnel, moreover, had to be heavily lined with solid concrete, the pressure upon it being so great.

Casault, Sir Louis E. N., was born and educated in the province of Quebec. He was a member of the Legislative Assembly of Canada 1854-8, and of the House of Commons 1867-70. Appointed a judge of the Superior Court of Quebec, 1870, and was one of the arbitrators who determined the disputed accounts between Canada and the provinces of Ontario and Quebec. He was chief justice from 1894 until his death, which occurred in 1908.

Cashmere (*kăsh′mēr′*), **Vale of,** or, as it is now usually spelled, Kashmir, the valley of the Upper Jhelum, celebrated in history and literature for the beauty of its scenery and the charms of its climate, lies in the feudatory state of Kashmir north of the Punjab. It extends for about 120 miles from northwest to southeast, with a mean breadth of 75 miles. The flat portion of the valley is not more than 80 miles long by 20 wide, with an elevation above sea-level of from 5,000 to 7,000 feet. In it are two lakes. It is entered by many passes, for ranges of the Himalaya Mountains traverse the country. Snow-capped mountains almost surround it, with their lower spurs descending in rice-producing, terraced slopes to the level part of the valley. On the margin of the lakes and throughout the whole valley are splendid groves of china or plane trees, here and there laid out with taste to form gardens and country seats, which two centuries ago used to be the favorite resorts of the Mogul emperors. Avenues of poplars line the river. On the surface of the lakes are floating gardens, made up of masses of growing plants from two to three feet thick. Occupying both banks of the river is the quaint old town of Srinagar, the capital. Seven log-built bridges cross the stream. The fertility of the soil is remarkable. Shawl-weaving and lacquer-work are the chief occupations of the people. Kashmir and Jammu form one of the feudatory or native states of India, with an area of 80,000 square miles and a population of about 3,000,000.

Cash-Register. The typical cash-register is that manufactured by the National Cash Register Company, of Dayton, Ohio, and found in so many retail stores. They serve two purposes: to check possible dishonesty of the assistants and to take the place of the cash-sale book. There are rows of keys, like those on a typewriter, but with numbers upon them; a cash drawer which can only be opened by pressing on a key; a bell that is rung whenever a key is pressed; and a sign which tells anyone looking at the face of the register what key has been struck. When anyone strikes a key, therefore, and thus opens the drawer, the bell gives notice of the fact. At the same time the customer sees whether the right amount was recorded. Finally, the machine makes a record, every time a key is struck, of the amount or number on the key; and it automatically adds them, so that at a glance the employer can see when he opens the record-box how many 5c, 10c, etc. have been received. He adds these totals into a grand total, and then checks by its aid the amount of money in the drawer. This record no one can get at without a key. In many such machines the operator can keep a separate record of the following accounts: amounts *charged; cash received;* and *cash paid out.* Thus the cash-register is a book-keeper as well as a detective. The first cash-register was that invented in 1879 by John Ritty, of Dayton, O. There are more complicated machines of the same general type for use in banks, etc. One important fact is that the machine makes *no mistakes* in adding.

Casimir-Perier (*kȧ′zē′mĕr′pȧ′ryȧ′*), **Jean Paul Pierre,** who became the fifth president of the French Republic (1894-5), was born in Paris in 1847. He received the cross of the legion of honor for his services in the Franco-Prussian War. His grandfather had been premier under Louis Philippe, his father also had been a cabinet-minister, and it is natural that he should have chosen a political career. In 1893 be became president of the Chamber of Deputies. On the assassination of President Carnot in 1894 he was elected president. After a short and stormy administration of six months he suddenly resigned and retired from public affairs. President Casimir-Perier is said to have been hampered in his policy even by his own ministers, over whose acts the constitution of the French Republic gave him but a slight control. He died March 12, 1907.

Cas'pian Sea, an inclosed inland sea or great salt-lake, the largest in the world, lies on the boundary between Europe and Asia. It is bounded on the south by Persia and on the north by Russia; with the Caucasus Mountains on its westward and the transcaspian territory on the east. Its length from north to south is 700 miles, and its breadth varies from 130 to 270 miles. Its total area is estimated at 170,000 square miles. On the east side, especially, there are several bays and peninsulas. On the south a low, flat plain, from 15 to 20 miles in width, leads to the lofty range of the Elburz Mountains; while the north is bordered by great steppes. The surface of the Caspian is 97 feet below the level of the Black Sea and 248 feet below that of Lake Aral. It is probable that all three bodies were once connected. The Caspian has no tides, but violent storms make navigation dangerous. Its level varies much at different seasons. In the middle it is divided by a submarine ridge, a continuation of the main Caucasus chain, into two deep basins. The greatest depth found in the northern basin is 2,526 feet and in the southern 3,006 feet. A number of large rivers empty their waters into the Caspian, of which the greatest is the Volga. The sea abounds in fish, and valuable fisheries are carried on, especially for sturgeon and salmon. By a canal uniting the upper tributaries of the Volga with those of Lake Ladoga and the Dwina, the Caspian is united with the Baltic Sea. The sea is now surrounded on three sides by Russian territory, the southern shore still remaining Persian. The Russians maintain a flotilla on the Caspian Sea, and lines of steam-packets ply upon it.

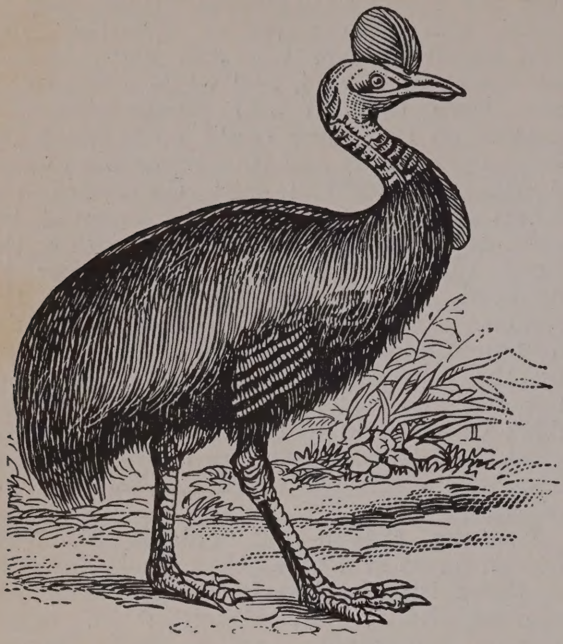
Cass, Lewis, an American politician, was born at Exeter, N. H., Oct 9, 1782. His family went west, and Cass studied law at Marietta, Ohio. He now entered politics is a Democrat, and played an important part in the War of 1812; was governor of Michigan and superintendent of Indian affairs for 18 years, during which time he negotiated 22 treaties with Indians and did much to open the northwest teritory; he also explored the upper lakes and the headwaters of the Mississippi. Cass was secretary of war, for a long time United States senator from Michigan, minister to France and candidate for president against Taylor. In 1860 Cass differed from President Buchanan in his southern policy, and resigned his position as secretary of state, closing a public career of 54 years. He was a man of much ability, a fine scholar and an effective speaker. He was the author of several works. He died at Detroit, Mich., June 17, 1866.

Cassandra (*ka-san'drȧ*), in Homeric legend, was the fairest daughter of Priam, king of Troy, and twin sister of Helenus. The two children were left one night in the sanctuary of Apollo, and while asleep their ears were touched and purified by two snakes so that they could understand the language of birds and thus know the future. Apollo afterward taught Cassandra the secret of prediction; but she rejected his love, and as a penalty he laid upon her the curse that no prediction should ever be believed. So she in vain predicted the treachery of the Grecian horse and the destruction of Troy, and was looked upon by the citizens as mad. On the sack of the city she was torn from the temple by Ajax Oileus, and in the distribution of the spoil she became the share of Agamemnon. She was afterward murdered by Clytemnestra.

Cassava (*kăs'sȧ-vȧ*). This is the West Indian name of a plant that grows not only in those islands, but in Brazil, Peru and tropical Africa. In Brazil it is called manioc (mandioc), and in Peru, yucca. From its stems, branches and leaves is obtained a juice, which, though a deadly poison when fresh, quickly becomes a wholesome food when heated, and is used as a soup by the natives. From the plant also is obtained arrowroot, which is almost pure starch. Tapioca also is made from it by heating the arrowroot until the grains of starch burst, are partly converted into dextrine and come together into small lumps. The pearl tapioca which is better known to us is not obtained from this plant, but from potato starch. Another important and well known product of cassava is farina, which also is almost pure starch. This is obtained from the roots, which are grated and then dried on hot metal plates. The cassava is remarkable for its fertility.

Cassiope'ia (*kas-sĭ-o-pē'yȧ*), a constellation in the northern hemisphere, not far from the north pole. It is marked by five stars of the third magnitude, forming a figure like a W. In 1572 there appeared in this constellation a new star, which, when first noticed by Tycho Brahe, exceeded in brightness all the fixed stars and nearly equaled Venus. The star gradually diminished in magnitude, and disappeared in March, 1584.

Cas'sowary, a large running bird, native to New Guinea and northeastern Australia. Although related to the ostrich, it belongs to a different family and lives in dense forests, while the ostrich lives on open plains and deserts. It has black plumage, with a naked neck, and bright-colored (red, blue, yellow) wattles. It is about five feet high, with rudimentary wings, a swift runner and a good swimmer. On the head is a hard bony cap or helmet. The head is carried low while running, and the vines and branches strike this cap and slide over the back. It feeds mostly at night on fruits and berries. The birds may be tamed. If teased, they kick powerfully sideways.


CASSOWARY

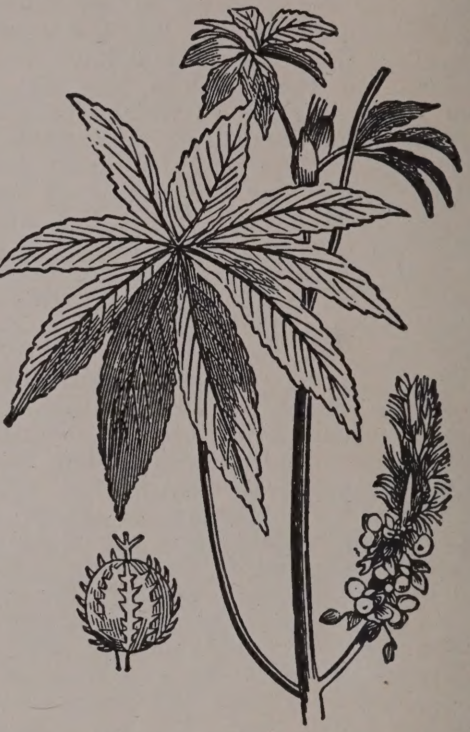
Cast, a term applied when a work of sculptured art—a figure or a group of figures—is reproduced in plaster or, less perishably, in bronze. Famous works of antiquity are often thus reproduced when replicas (duplicates or repetitions) are made of them as models for study in schools of art or for exhibition in museums or art galleries. The process of reproduction is first to lubricate the original carefully that it may not be injured or defaced, and so that the applied plaster shall not adhere to it when it is coated with the plaster, after which, when the latter is dry, the mold or shell is removed, either whole or in parts. This cast, as it is called, when it is put together, furnishes, generally speaking, a faithful reproduction of the original, and from it repeated copies may be similarly made. When the original is designed to be reproduced in bronze or other metal, the process is termed founding, the reproduction being done from suitable molds in a foundry.

Caste. See INDIA.

Castelar (*käs'tä-lär'*), **Emilio,** a Spanish orator, statesman and writer, was born at Cadiz, September 8, 1832. He was for some years professor of history and philosophy in the university at Madrid. He took part in several political uprisings and helped to bring about the downfall of King Amadeus in 1873. Castelar became dictator, but, when Alphonso XII became king, he fled across the frontier. He returned to Spain in 1876 and devoted himself more to literature than to political and social questions. He died in 1899.

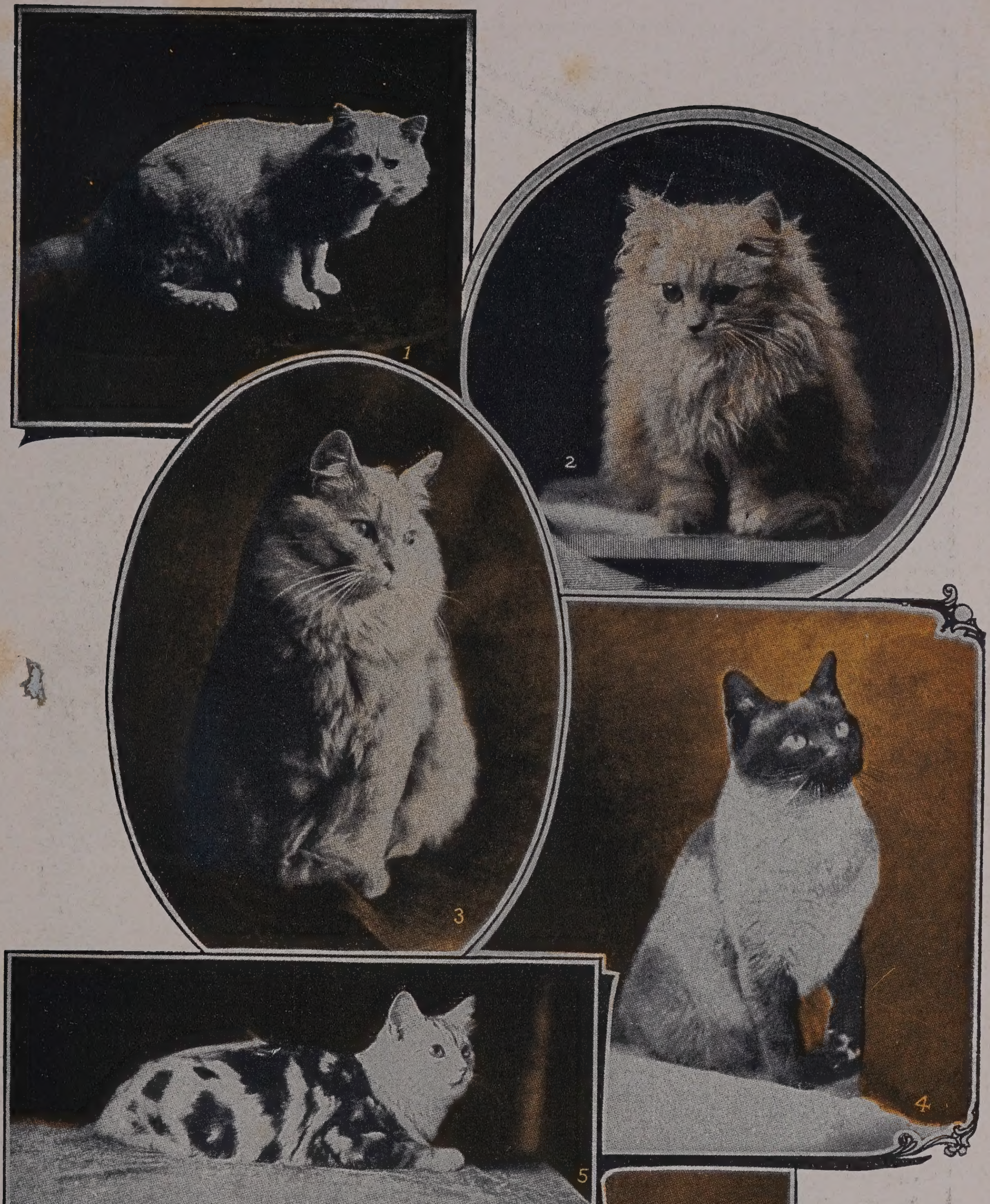
Castile. See SPAIN.

Castor-Oil, a familiar and simple purgative, derived from the seeds of the castor-oil plant (*Ricinus Communis*), a native of the Indies. Used as a laxative, it has a nauseous smell and disagreeable taste, which can, however, be partially overcome by using it in capsules of gelatin or by floating the oil on hot coffee. It is considerably used in the arts as a lubricant for machinery, while in the East Indies it is employed as an illuminant as a lamp-oil.

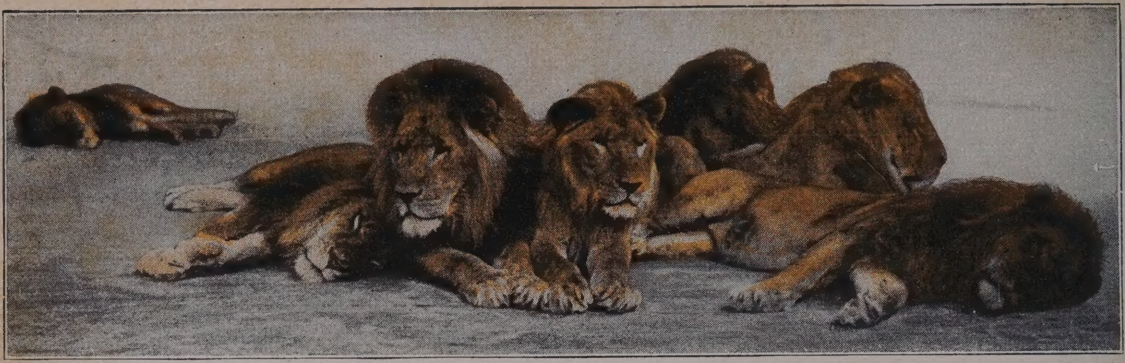

CASTOR-OIL PLANT

Cas'tor and **Pol'lux,** often called Sons of Zeus, were, according to Homeric story, the brothers of Helen of Troy; but another tradition makes them only half-brothers of Helen, their father being Zeus; while still a third account makes only Pollux Zeus's son, and so he alone was immortal. Castor was famous for his skill in managing horses; Pollux for his powers in boxing. Both received divine honors at Sparta as patrons of travelers by sea. They assisted at the battle (496 B.C.) of Lake Regillus. Zeus placed the brothers among the stars. They are the principal stars in the constellation of *Gemini* or the twins. Their names are also given to the electric appearance known as St. Elmo's Fire.

Cat, the name of a family which includes besides the wild and domestic cat, such animals as the lion, tiger, leopard, puma, jaguar, cougar or American panther, etc. The wild cat of Europe is larger and stronger

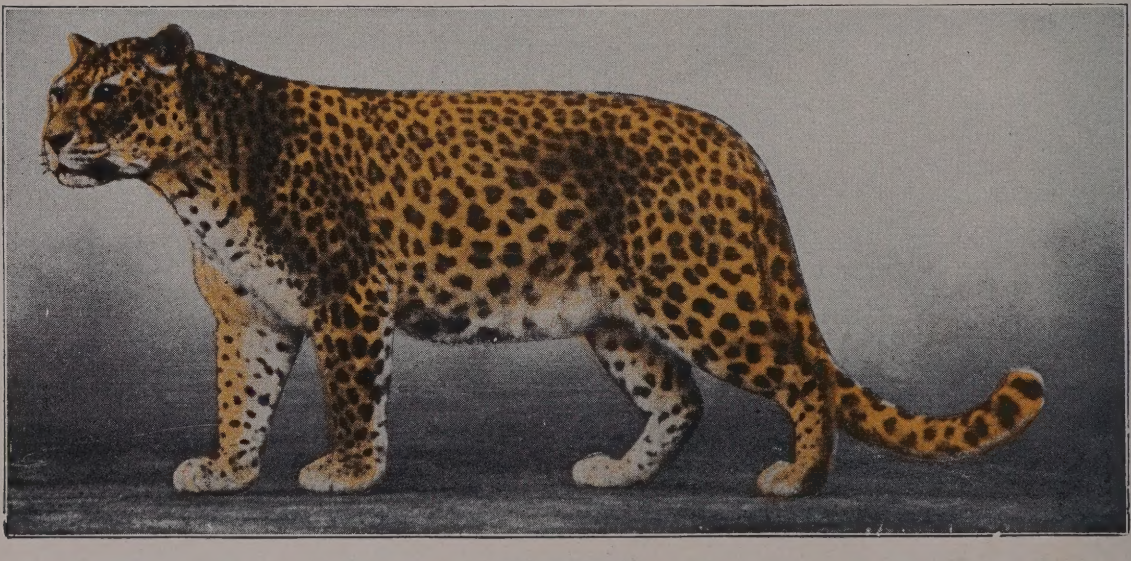


1 White Persian 2 Light Silver 3 Cream Persian 4 Siamese 5 Silver Persian
6 Short Hair Tortoise Shell



A GROUP OF LIONS.

ROYAL BENGAL TIGER.



LEOPARD.

than the house cat, with yellowish-gray fur and dark stripes down the back, along the sides, across the legs, and rings on the tail. In common with all the wild members of the family, it is very fierce in disposition. The animal called wild cat in America is a lynx. The common domestic cat probably is a descendant of the Egyptian cat, which was tamed thirteen centuries B. C. From Egypt it was carried into Europe, but was long scarce and very expensive. There are many varieties of cats. Some of the best known are the fawn-colored, royal Siamese cat, with blue eyes and small head; the Maltese cat, of a bluish-gray color; the large Angora or Persian cat, with long, generally whitish fur; and the beautiful Spanish or tortoise-shell cat. The Manx cat of the Isle of Man has no tail and has very long hind legs. In cats the senses of sight, hearing and touch are very highly developed, and the intelligence also is great. Their whiskers are sensitive hairs, and the pupils of their eyes expand in the dark, enabling the animals to see with a small amount of light. The habits of domestic cats are well known, and they do many clever things. From early times cats have been the objects of superstition. In Egypt they are held in the highest reverence.

Catacombs (*kăt'ȧ-kōms*), are ancient underground places for burying the dead, consisting of galleries or passages with side recesses for tombs. Those in Egypt, the burial places of the ancient kings, are very remarkable; but the most important are the famous Roman catacombs. These are to be found on almost all the roads leading out of the city, at a distance of two or three miles outside of the walls. More than forty such cemeteries are known to have existed, and two thirds of these were of considerable extent; and, if the galleries were extended in a straight line, they would reach at least 300 or 400 miles. Many of them are very old having been originally quarries; but a large number were dug solely for the purpose of burial and as places of worship. Each catacomb forms a network of passages or galleries, usually eight feet high by two or three wide. The graves are in tiers on the sides, and when undisturbed are found closed by marble slabs or tiles, on which are often found inscriptions or Christian emblems. The catacombs were used by the Christians during the ages of persecution as places of burial and also of worship; but the use of them was at various times forbidden, and at the beginning of the fifth century the practice of burial there entirely ceased. When the ages of persecution came to an end, a new era opened in the history of the catacombs. Christian pilgrims flocked from all lands to see them and to do honor to the martyrs entombed there. Some of the more important tombs were decorated with marble and some with gold and silver. In the sixth and eighth centuries they were ravaged by the Goths and Lombards, and in consequence the sacred relics were removed to the churches. The catacombs then fell into neglect, and were almost forgotten by the Christian world. They were at this time thronged with outlaws and assassins. They were again somewhat cleared, and in 1578 an accidental landslip brought them to light and they soon attracted universal attention.

Catalani (*kä-tȧ-lä'nē*), **Angelica,** an Italian singer, was born in 1779 near Ancona. In her seventh year she displayed such wonderful powers that strangers flocked from all quarters to hear her. She began her professional career at Venice when eighteen years old, and for more than thirty years passed through a series of triumphs in every country in Europe. Her large, queenly person and fine countenance, the immense volume and range of her voice and at the same time her lightness and ease in its use everywhere took her audiences by storm. She twice directed the Italian opera in Paris. She bought a villa near Florence after retiring from the stage, where she gave free instructions to girls who had a talent for singing. She died in 1849.

Catalina (*kăt-ȧ-lē'nȧ*) **Island.** See SANTA CATALINA ISLAND.

Catalonia (*kăt-ȧ-lō'nĭ-ȧ*), an autonomous region and former province of Spain, is situated in the northeastern part of that state south of the Pyrenees. It is bounded on the south by the Mediterranean. It is composed of the provinces of Barcelona, Gerona, Lerida and Tarragona, extending over an area of 12,427 square miles. It is the principal agricultural and manufacturing district of Spain. The soil is especially productive in the valleys where grain, flax, grapes and fruits are grown. Much of the region is rich in minerals including iron, copper, zinc, coal and marble. The principal seaport and seat of Spanish commerce is Barcelona.

On September 9, 1932, a statute was passed by the Spanish Cortes which provided for the equality of Catalan with the Castilian language. Its representative organ is the *Generalidad,* which is integrated by a Parliament of eighty-five members elected for five years, a President and The Executive Council. The President of the *Generalidad* is elected by the Catalonian Parliament. Both Spanish and Catalan are spoken but for official intercourse of this region with the rest of Spain and with State authorities, Spanish is the only official language. The first elections to the Parliament were held on November 20, 1932. Parliament held its first session on December 6, 1932. In 1932 the population of Catalonia was 2,490,889.

See BARCELONA; SPAIN.

Catalpa (*kȧ-tăl'pȧ*), a kind of tree of which there are seven or eight species, two being found in the United States. The common catalpa is a native of the southern part of the United States, and is cultivated as an ornamental tree in most of the cities of the northern states. It has silver-gray bark, and its showy flowers are white, slightly tinged with purple and violet in the throat. The flowers are followed by pods, often a foot in length, which hang until the next spring. In its natural locality this tree seldom exceeds 40 feet in height. The wood is light in color and coarse-grained, and is used in exterior finish, for fence posts and railroad ties. It is known by various names, as Indian bean, candle-tree and bean-tree. Catalpas belong to the *Begonia* family.

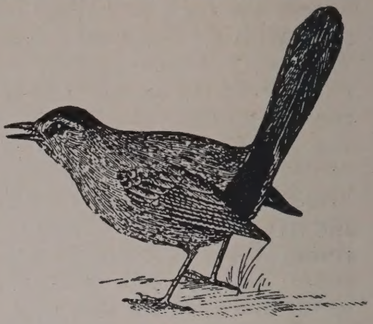
Catania (*kȧ-tä′nẽ-ȧ*), a city and seaport of Sicily, near the foot of Mt. Etna. The fertile and well-cultivated plain of Catania is styled the granary of Sicily, and has given the city the title of Beautiful Catania. By eruptions of the great volcano and by earthquakes, the city has been several times almost entirely destroyed, but out of its ruins it has always risen with increased beauty. It now is the finest city of Sicily, being built throughout on a beautiful and uniform plan. Among the chief buildings are the Benedictine convent of San Nicola, the cathedral, founded in 1091, and the university, founded in 1434, which has a faculty of 48 professors and 1,048 students. There are manufactures of silk and linen goods and of articles in amber, lava, wood, etc. There have been some remains of ancient times found here, including those of a theater, a temple of Ceres, Roman baths and an aqueduct. Catania was founded by the Greeks in the 8th century B. C., and became a flourishing city. It was desolated by Dionysius I, but again rose under the Roman sway. It was destroyed by earthquake in 1909. Population, 211,699.

Catapult (*kăt′ȧ-pŭlt*), an ancient military engine for throwing stones, arrows, javelins and other missiles. It was invented in Syracuse in the reign of Dionysius the Elder. It consisted of a wood framework, a part of which was elastic and furnished with tightly drawn cords of hair or gut. It acted on the principle of a bow. Catapults were of various sizes. The largest would throw a beam six feet long and weighing 60 pounds to a distance of 400 paces.

Cataract. See WATERFALL.

Catawbas (*kȧ-tạ′bȧz*), a tribe of Indians in North and South Carolina, now reduced to a mere handful. When these states were settled, they were a powerful tribe with 1,500 warriors. They occupied six towns on Catawba River. They were a warlike people, early engaged in strife with the Cherokees and later with the Shawnees and Iroquois, but were freindly to the settlers and served with them in the Revolution. They retired on a reservation, and have since decreased greatly. There are now about 200 half-breeds in the reservation bearing the name. Pontiac is said by some to have been by birth a Catawba. The last full-blooded Catawba, Peter Harris, was a Revolutionary soldier.

Cat′bird, a very common, well-known bird in the United States, related to the southern mocking-bird and other thrushes. The ordinary song of the male during the mating season is musical and agreeable, but both male and female utter on occasion a disagreeable cry, like the mewing of a cat, and from this their name is derived. The bird is slaty-gray with black cap and tail. It nests in thickets and shrubbery near settlements, seldom more than four or five feet from the ground. The nest is a bulky affair of twigs, leaves, grasses and fine roots. The four or five eggs are of a bluish-green color. The bird arrives in New England in May, and departs for the south the middle of October.


CATBIRD

Caterpillar, the immature stage of butterflies and moths, intermediate between the egg and the perfect insect. What the tadpole is to the frog, the caterpillar is to the butterfly or moth. They are both called larval stages, and when the extensive change takes place, transforming them into adult stages, it is in both cases called a metamorphosis. (The metamorphosis of insects is general and by no means confined to butterflies and moths). The butterfly or moth deposits eggs, which, in place of hatching in the form of the parents, hatch as worm-like caterpillars. But caterpillars, although worm-like in form, are not worms; they are immature stages of insects. They all have three pairs of jointed legs like insects (also additional false-legs or supports), and all breathe by air-tubes like insects. Caterpillars vary greatly in form, size and coloring. There are the common heavy or woolen varieties, and many others that are unprovided with hair but usually with bright colors. The common measuring-worms, the large green tomato-worms, the striped, spotted, and various-colored worms found on milkweed, tobacco, apple-leaves, mulberry and other plants are illustrations.

The rearing of these larvæ, in order to watch the changes, is now a common thing; boxes open to the air, but provided with wire screens, are used. Into these are placed the larvæ and some of the leaves of the plant on which they are found, and these are renewed from time to time. They will grow in the boxes so tended, and, when they have reached their full growth, will pass into the stage of a pupa or chrysalis. The latter vary also greatly in form and appearance. Some kinds spin cocoons around themselves, others draw the skin over the back and form a sort of case into which they retire.

Some, like the tomato worm, burrow into the earth, and there form a dark brown case, provided with a long, slender, curved handle; the resemblance of the whole structure to a brown jug gives this form the not inappropriate name of the jug-handle. Enclosed within the handle is the sucking tube of the mouth. The chrysalids formed upon bushes are often ornamented with bright golden metallic spots. The cocoons of the silkworm are the ordinary cases of the chrysalids of that moth. Just what takes place within the cocoon is not thoroughly understood, but the living part of the body is all worked over. Disks appear upon the caterpillar, from which grow the wings, legs and other parts of the perfect insect. The period of residence within the cocoon is not one of sleep nor single change, but a period of reconstruction.

Caterpillars are preyed on by birds and other animals, but these apparently defenseless creatures have means of protecting themselves from their natural enemies. Sometimes they are covered with stiff hairs or sharp points, making them disagreeable to swallow. Some, by reason of secretions, have an unpleasant taste or odor, and birds soon learn to leave them alone. Sometimes the harmless forms assume the colors of the harmful kinds, mimic their movements and thereby save their own lives. The bright colors of the poisonous or unpleasant ones are called warning colors. Others still are protected by resembling in color and markings the objects on which they live and so escape notice. Caterpillars often are very destructive. The woolen moth has a small, worm-like larva, that feeds on woolen fabrics, and furs. The yearly injury to crops is enormous. The sole business of the larvæ is to eat and grow, and they may eat many thousand times their weight before going into the chrysalis state. The destruction caused by the army-worm is very great. The loss from the cotton-worm in one year was above thirty million dollars, as estimated by authorities of the United States government.

Catfish, a common fish inhabiting both marine and salt waters, and named from its fancied resemblance to a cat. It has a large head and slender barbels about the mouth, like a cat's whiskers. The common cat-fish of the United States, also called stone-cat, channel-cat, bullhead, and mud-cat, is abundant in sluggish waters. It is dark, and scaleless, with sharp spines near the front fins and one on the back, which make painful wounds. Among catfish of other countries are the sheathfish of Europe, wolf-fish of Great Britain, spotted logfish of England, and tandan of Australia. Edible catfish include the Bermuda; the blue or Mississippi, which is the largest of the channel catfish of southern United States and often weighs more than 100 pounds; the large Great Lakes; the yellow cat, common from the Great Lakes to Louisiana, and one of the best known; and the spotted cat of the Mississippi Valley. Unusual types of catfish are the blind fish to be found in caverns in Pennsylvania, and the electric catfish of the Nile, which can give a distinct electric shock when touched.

See FISHES; FISH CULTURE.

Cathay (*kȧ-thā′*), the name applied to China by the western nations of Europe in the middle ages, is a term now seldom employed except in poetry and rhetoric. "Better fifty years of Europe than a cycle of Cathay" writes Tennyson in *Locksley Hall.*

See CHINA.

Cather, Willa Sibert, a distinguished American novelist, was born at Winchester, Virginia, on December 7, 1876, the daughter of Charles F. and Mary Virginia (Boak) Cather. Her family was of English descent. Because of their loyalty to the Stuart cause they received a grant of lands in Ireland, from which her great-grandfather emigrated to America, settling in Virginia. When Willa was eight years old, the Cathers moved to a ranch in Nebraska. The contrast of western life to her almost Puritanical upbringing, and the English community from which she came, was startling. She met immigrants, chiefly German, Swedish, and Bohemian, and saw something of the pioneer struggle with the soil which later figured so sharply in her works. She received her elementary education at home, reading the English classics to her grandmothers, and mastering Latin. Her family moved to Red Cloud, Nebraska, where she was graduated from high school. It was here that she worked on a newspaper to pay for her further education at the University of Nebraska, from which she received the degree of B. A. in 1895.

Willa Cather then entered upon a journalistic career with the *Daily Leader* in Pittsburgh, Pennsylvania. In 1901 she accepted a position as head of the English department in the Allegheny High School. At this time she also began her first writing for publication, chiefly poems. In 1903 appeared her first book, *April Twilights,* a collection of verse. This was followed in 1905 by *Troll Garden,* a collection of short stories, so outstanding that they won for her an editorial position on *McClure's Magazine* in 1906. She remained with McClure's until 1912. From 1908 to 1912 she was managing editor of this publication and travelled extensively. After 1912 she devoted herself to writing.

Literary critics generally accord to Miss Cather the foremost place among contemporary women novelists of the United States. She is more interested in presenting a cross section of life than in compressing material to the usual telescopic plot pattern. A realist and a poet, she shows the glamour of romance in realism. Her pioneer novels are historically accurate, and portray the spirit of the early days in a wistful, sad beauty that gives a touch of poignancy to the lives of the characters who move so heroically through the pages. Miss Cather writes with great clarity and charm, in beautiful poetic prose. She has chosen to picture chiefly the midwest and southwest, although *Shadows on the Rock* (1931) is a departure to the early French days in Quebec. *One of Ours,* a novel laid in the midwest and resolved by the World War, won the Pulitzer Prize for 1922. *My Antonia* (1918), and *Death Comes for the Archbishop* (1927), are probably her finest works, although *The Professor's House* (1925) is very popular in academic circles for its sympathetic interpretation of the human side of the teaching profession, and among intellectuals for the perfection of the story of Tom Outland, a jewel "set in silver" within the book. Miss Cather has received honorary degrees from the foremost universities in the United States, and her novels have been translated into French, Swedish and Czech. Among her other works are included: *Alexander's Bridge* (1912); *O Pioneers* (1913); *The Song of the Lark* (1915); *Youth and the Bright Medusa* (1920); *A Lost Lady* (1923); *My Mortal Enemy* (1926), and *Obscure Destinies* (1932).

Catherine I, wife of Peter the Great, and Empress of Russia, was born about 1680, the daughter of a Roman Catholic peasant. She was married to a Swedish dragoon. At the storming of Marienburg in 1702 she was at the mercy of the Russian officers, and finally became the mistress of Peter the Great, to whom she was secretly married in 1707. The marriage was acknowledged in 1711, in which year she was able to render great service to her husband by securing better terms than had seemed possible in ending his war with the Turks. Catherine was crowned in 1712, and upon the death of Peter the Great in 1725, was solemnly proclaimed Empress and autocrat of all the Russias. Although unprincipled, and an adventuress, Catherine accomplished much for Peter the Great and for Russia. She died in 1727.

Catherine II, Empress of Russia, was born at Stettin in 1729, the daughter of a Prussian prince. She was severely educated. In 1745, she was chosen by the Empress Elizabeth as the bride of her nephew and heir, Peter. Catherine and Peter quarreled constantly, and each led a life of open vice and court intrigue. In 1761 Peter III ascended the Russian throne. He was unpopular, and his attempt to divorce Catherine made him the victim of a conspiracy in which tradition implicates her also. He was imprisoned and murdered in 1762. Catherine was proclaimed Empress of Russia. Catherine's reign was energetic. She was a woman of great ability, skilled in diplomacy, although her court was notorious for its corruption, and she herself unprincipled, stooping to any means that would help her to attain her ambitions. Her reign was remarkable for the rapid increase of the domain and power of Russia. Through two wars with Turkey, the three partitions of Poland, a war with Sweden, and the acquisition of the southern Baltic province of Courland, she brought great additions of territory and prestige to her Empire. She also greatly improved the interior, furthering the building of roads and canals, the founding of towns, the extension of commerce, and the protection of the farmers. She was particularly fond of literature, and one of the correspondents of Voltaire. She died at St. Petersburg in 1796.

Catherine de Medici (*dā mā'dē-chē*), queen of Henry II of France and mother of Francis II, Charles IX, and Henry III, was born at Florence, Italy, in 1519, the daughter of the famed Lorenzo de Medici, and niece of Pope Clement VII. She was married at the age of fourteen to Henry, the second son of Francis I of France, who became king in 1547. After Francis II became king in 1559, she gradually became more influential. This crafty woman made a secret alliance with the Guises against the Huguenots, and later a secret treaty with Spain to extirpate heretics. These hatreds led to the terrible massacre of St. Bartholomew, which took place after her son Charles IX had ascended the throne in 1560. Her third son was elected to the Polish throne, and became Henry III of France after the death of Charles IX. She ruled the court during his reign also. Her many betrayals led to equal distrust on the part of the great Catholic League, headed by the Guises and her fourth son, the Duke of Alençon, until his death; and the Protestants, headed by Henry of Navarre. A woman of eloquent manners, and fine tastes, a patron of literature, sculpture and painting, she died unmourned in 1589. See HUGUENOTS.

Catherine of Aragon (*ăr'ȧ-gŏn*), queen of England and first wife of Henry VIII, was born in 1485, the fourth daughter of Ferdinand, King of Aragon, and Isabella of Castile. When scarcely sixteen she was married to Arthur, Prince of Wales, son of Henry VII. His death a year later left her a widow, but she was almost immediately betrothed to his brother Henry, whom she married in 1509, having received the papal dispensation. A short time later, they ascended the throne of England together. She lived happily for twenty years with Henry. Five children were born to the royal couple, but only Princess Mary lived. The lack of male issue, and the king's passion for Anne Boleyn, one of Catherine's maids of honor, led him to seek a dissolution of the marriage, which the pope refused. Cranmer declared the marriage null and void in 1533, some four months after Henry's marriage to Anne Boleyn. This brought about the rupture between England and the Church of Rome, and led to the establishment of the Church of England. Catherine, grief-stricken, retired into privacy, and led an austere religious life until her death in 1536. See HENRY VIII.

Catherwood, Mary Hartwell, an American novelist, was born at Luray, Ohio, in 1847. She was educated at the Granville Female

College. Her first novel, *Craque o' Doom*, published in 1881, was followed by a series of historical novels, with a French-Canadian background. *The Romance of Dollard* (1889) was the first of these to bring fame to Miss Catherwood. Others were *The Story of Tonty* and *The Lady of Fort Saint John.* She wrote of the midwest in *Old Kaskaskia* (1893); *The Spirit of an Illinois Town* (1897), and *Heroes of the Middle West* (1898). *The Days of Jeanne D'Arc* (1897) is famous among her works with scenes laid in other localities. Miss Catherwood is noted as a local colorist. She died in Chicago in 1902.

Cathode Rays (*kăth'-ōd*), a phenomenon accompanying electric discharge in a vacuum tube in which the pressure is something less than one one-thousandth of a millimeter of mercury. The wire by which the electric current enters the tube is called the *anode:* the wire by which the current leaves is called the *cathode.* When the region between the anode and cathode is a perfect vacuum, the walls of the vacuum tube exhibit a brilliant phosphorescence, as if they were bombarded by particles which are projected from the cathode. These particles appear to travel in straight lines from the cathode to the walls of the glass tube; for if a screen be placed in the region between the cathode and the wall, a shadow geometrically similar to the screen is cast on the wall. Another remarkable property of the cathode rays is that they are deflected from their rectilinear paths by a magnet. In this respect they behave as if they were flexible electric conductors. It was this fact that led Crookes to suppose them negatively electrified particles shot from the cathode. Most interesting of all, perhaps, is the fact, discovered by Roentgen in 1895, that whenever cathode rays strike the walls of the vacuum tubes they give rise to X-rays.

See CROOKES, SIR WILLIAM; ROENTGEN RAYS.

Catholic Church, the church universal, especially the ancient undivided Christian church, called the true apostolic church. The term "catholic" first appears in the letter written by St. Ignatius to the Smyrnæans, about 110, and is used later by Clement of Alexandria. It was not put into formal use until about the beginning of the third century. Originally it designated the entire body of Christian believers, but was officially taken as a title by the Western Church when it separated from the Eastern Church, which took the title of Orthodox. After the Reformation the Church of Rome asserted its right to the exclusive use of the title, which is generally accorded that church in practice to-day.

See ROMAN CATHOLIC CHURCH.

Catholic University of America, a Roman Catholic institution of higher learning, is situated in Washington, D. C. It received a constitution from Pope Leo XIII in 1887, and was opened in 1889. The University was originally founded to give professional training and facilities for original research to graduates of Catholic seminaries and colleges. In 1911, a teacher's college was established in connection with the Catholic University, for the benefit of Catholic Sisters. Cardinal Gibbons was the first chancellor, which position he held until his death, greatly advancing the growth of the University and perfecting its organization. The University is governed by a chancellor, rector and treasurer, and a self-perpetuating board of trustees chosen from the episcopate, clergy and laity. Its various faculties include 150 professors, and the student body numbers 1,600.

Catiline (*kăt'ĭ-līn*), **Lucius Sergius** (**Catilina**), a Roman conspirator, was born about 108 B. C., of a noble family. After an ill-spent youth he took part in the bloody successes of Sulla's party, was made prætor and in 69 became governor of Africa. In 70, charges of misrule in his province caused him to be ruled out as a candidate for consul. He formed a conspiracy against Rome, the first project of which was to kill the great orator Cicero, whose death would be the signal for revolution. Fulvia, whose lover was one of the conspirators, revealed the plot to Cicero, who frustrated their design easily. At a secret meeting held on the night of November 6, 63 B. C., Catiline explained a new project for murdering Cicero, bringing an army he had won over up to the city, and setting Rome on fire. Within a few hours Cicero knew every word that had been spoken. Two days later Catiline recklessly took his seat in the senate. Cicero thereupon rose, pointed his finger at the traitor and pronounced his famous invective beginning *"Quousque tandem abutere, Catilina, patientia nostra?"* He revealed to the entire senate the smallest details of the conspiracy. Catiline's attempt at reply was lost in cries and hisses; he rushed from the senate and escaped from Rome by night. An army under Antonius was sent against him, and Catiline was defeated and slain in Etruria in 62 B.C. He fought bravely, in keeping with his character. For Catiline was able to bear great fatigue; he had a masterful, resolute mind; but his face had a haggard, reckless look, and in later life he seemed in a constant fever of disappointed ambition, which caused his downfall and destruction.

Catkin, the characteristic flower-cluster of the birches, alders, etc. See INFLORESCENCE.

Cato (*kā'tō*), **Marcus Porcius** (surnamed The Censor), was born at Tusculum in 234 B. C. Marcus Porcius was his proper name. Cato, meaning wise, was a title given him later in life when he held office as censor. He spent his boyhood on his father's farm, and there learned simple manners and ways of living. When seventeen, he served with great bravery in the army against Hannibal. At the same time he was becoming known as an orator and statesman. Because of his ability and uprightness, he was made consul in 195 B. C., although his family was unknown. Made, the next year, governor of Spain, he showed such skill and vigor in putting down a rebellion there, that the people gave him a military triumph on his return to Rome. In 184 he was chosen censor, and at once became very active in using his office to carry out his ideas of simplicity, of honesty in government and of dislike of everything which was new. He put the water-courses, reservoirs and drains in good order; had the taxes collected more cheaply; saw that less money was paid for building the great public buildings; and decided what price should be paid for slaves, clothes, furniture, carriages, etc. Rome was growing rich from the spoils and plunder of her successful wars, and the Romans had caught from the Greeks a liking for fine clothes, great palaces, many slaves and all that made up luxury in life. These new ways of life Cato despised and fought against. The famous saying, "Carthage must be destroyed," which became a battle-cry of the Romans, was first used by Cato, who never made a speech in the senate without using the appealing, insistent words to inflame the ambitions of the Roman people. He died in 149 B. C.

Ca'to, Marcus Porcius, called **Cato the Younger,** the great-grandson of the elder Cato, was born at Rome in 95 B. C., and committed suicide in North Africa in 46 B. C. When only 14 years old, he went with his tutor one day to call upon Sulla, and, seeing the heads of several famous men, who had been put to death by the tyrant, carried away from the house, he asked why some one did not kill him. His tutor answering that no one dared to do so, he exclaimed that he would do it himself, if he would give him a sword. He greatly admired his great-grandfather, and took him as his model in life. He was rich, but lived in a simple manner, always walking instead of riding, wherever he went, and often going barefoot.

He held the office of quæstor, and carried through so many needed reforms that when he left office, he was praised by all classes of citizens. He was an open enemy of the three most powerful men in Rome, Cæsar, Pompey and Crassus, who, he foresaw, would destroy the republic, as they did when they formed the first triumvirate or government of three. Cæsar he had denounced years before as a friend of the traitor Catiline, and after the battle of Pharsalia he set out to join Pompey, now the defeated rival of Cæsar, but, hearing of his death, fled to Africa. He wished to defend Utica, but on the approach of the conqueror the citizens refused to fight. Cato, disdaining to surrender, killed himself after spending the evening talking with his friends and reading Plato's *Phædo*. His death was for two centuries regarded as the right death for a Stoic by the noblest of Romans.

Catskill Mountains, a group of mountains in New York, west of the Hudson River and south of the Mohawk. They form part of the Alleghenies, and cover an area of about 5,000 square miles, some peaks being 4,000 feet high. The scenery among the deep valleys with their precipice-like walls is fine and often grand.

Catt, Mrs. Carrie Chapman, educator, lecturer, suffragette. Born at Ripon, Wis. She was educated at the State Industrial College of Iowa, and at one time was general superintendent of schools at Mason City, Iowa. She was the organizer of the Iowa Woman Suffrage Association, 1890–2. Later she was president of the National American Woman Suffrage Association, president of the International Woman Suffrage Alliance, 1904; and was the leader in the campaign that gave the voting franchise to women in the United States on August 26, 1920. Her home is in New York City.

Cattle, a term usually applied to domestic quadrupeds of the bovine family, the ox and the cow, and are the most useful to man of all domestic animals. They were probably the first animals to be domesticated. The ox has always been used as a beast of draught and burden, but is even more important as a source of food, furnishing man with meat, butter, milk, and cheese. The cow is the poor man's dependence, and, as the basis of the meat and dairy industries, is a large factor in the commerce of the world. Certain breeds of cattle have been developed for meat, as the Shorthorn or Durham, Hereford, hornless Angus, Galloway, and Redpolled. All of these have heavy, square bodies, often weighing 2,000 pounds live weight. Among the dairy breeds are the Holstein, noted for quantity of milk; the Jersey, for quality of milk, the Ayrshire and the Alderney. See AGRICULTURE, BUTTER, DAIRY FACTORIES, MILK and MEAT PACKING.

Catullus (*kȧ-tŭl'lŭs*), **Gaius Valerius,** a celebrated Roman lyric and elegiac poet, supposed to have been born at Verona, Italy, B. C. 87, and to have died about B. C. 54. What is known of his life is chiefly derived from his writings, which consist, to some extent, of amatory poems addressed to one Lesbia, of his journeyings and pleasant home life at a villa (modern Sirmio), on Lake Benacus (now Lago di Garda). He is known to have had Cicero, Cæsar, Cinna and Cornelius Nepos among his intimate friends. He has great versatility and sprightliness, with the Greek lyric spirit and beauty of expression.

Caucasian (*ka̱-kā'shan*) was the name adopted for one of the main race divisions of mankind; but later, mainly because of the difference in the languages spoken, the Caucasian has been broken up into two groups, the Aryan and the Semitic peoples. Caucasus was a misnomer, as there was no connection in race between the Aryan, the Semitic and the 16 or more distinct races of the Caucasus Mountains. The word is now used for the fair type of man as opposed to the black, the red and the yellow type; but it is understood not to imply any common race or language in the peoples included under the name.

Caucasus (*ka̤′kȧ-sŭs*), a mountain range which occupies the isthmus between the Black and Caspian Seas, its general direction being from west-northwest to east-southeast. It is about 750 miles long by 150 miles broad. There are at least six peaks over 16,000 feet high; Mt. Elburz, 18,000 feet, is the highest. There are but few glaciers, very little perpetual snow and no active volcanoes, though Elburz and other peaks are of volcanic formation; while there are hot springs and mud volcanoes at each extremity of the range. There are but two roads across the Caucasus, the Derbend Pass and the fine military road built by the Russians through the Dariel Gorge. The Caucasus has been called the mountain of languages, from the many tongues, distinct from one another, having little or no likeness to any other languages on the globe, which are spoken in this narrow area. Some 16 or more distinct and well marked races, including the Georgians, Circassians, etc., are found in the region of the Caucasus. For over 50 years this region resisted the advance of Russia; but with the capture of Schamyl, the prophet-chief of the Lesghians, who had withstood the armies sent against him for 20 years, the power of the Caucasians was shattered. Since 1871 the country has been wholly under the dominion of Russia.

Caucus (derivation doubtful), in politics, a term applied to designate a conference, generally preliminary to a subsequent public meeting, of men who desire to select delegates, nominate certain party representatives for office or take certain action in regard to some public question, give shape to and outline proposed later legislation, as well as to ascertain and discuss the views of those so called together in preliminary and sometimes secret council. The deliberation is one usually held to promote unity among members of the same party, in regard to public measures, and suggesting the line to be taken in advancing such, or possibly, in balking and defeating them, if objected to or deemed unwise and inexpedient.

Cau′licle (in plants), a name formerly applied to the hypocotyl, that is the stem-like part of a seedling, which appears below the first leaves or cotyledons. See EMBRYO.

Cavalier (*kăv′ȧ-lēr′*), meaning horseman at first, but afterward it came to mean gallant, and was so used by Shakespeare. In the struggle between Charles I and Parliament in 1641, the courtiers were nicknamed cavaliers, while the friends of Parliament were called Roundheads. At first applied in derision it was held as a title of honor, until after 1679 when it was replaced by the term Tory.

Cavalry. See ARMY.

Cave-Men, prehistoric dwellers in caves or caverns, usually convenient to streams of water. Their homes have been traced in Belgium, France, Switzerland and also in Britain, and in their cave-shelters have been found primitive tools and weapons and the teeth and bones of the animals on which they rudely subsisted. Their era appears to have been the paleolithic or stone age. They were a tall, powerful race, fitted well for their early rude environment, primitive in their manner of life, and without skill to fashion or invent any but the simplest weapons and utensils They were ignorant of the metals, of pottery and of agriculture, and had no domestic animals.

Cav′endish, Henry, a distinguished English chemist and physicist, born at Nice, Oct. 10, 1731, died Mar. 10, 1810. His most important work includes the discovery of the composition of water; the composition of nitric acid; and the determination of the mean density of the earth. Since the discovery of argon by Lord Rayleigh, it has become evident that Cavendish in his studies on the composition of air had, at that early date, isolated argon, but without knowing it. Cavendish was never married. He was a man of great wealth, leaving a private fortune of between three and four million dollars.

Cavite (*kȧ-vē′tȧ*), Philippine Islands, a province and city in Luzon Island, on the southwest side of Manila Bay, seven or eight miles southwest of Manila. Since the Philippines were ceded to the United States in Dec. 1898, after the close of the war with Spain, Cavite harbor, which is strongly defended, has become the chief naval station of the archipelago. There, on May 1, 1898, an American squadron under Admiral Dewey destroyed a Spanish one under Admiral Montojo. Besides the docks, repair shops and government-buildings, Cavite has an arsenal and in the town a hospital, several convents and churches, together with an extensive tobacco factory. The area of Cavite province is 500 square miles and the population of the city (1907) about 4,500.

Cavour (*kȧ′vōōr′*), **Camillo Benso, Count di,** the restorer of Italian unity and nationality, was born at Turin, Aug. 10, 1810, of an old noble family of Piedmont. He was a student of the military school, and when only 16 was made an officer of engineers. At an early age he was stirred with a desire to improve the condition of his country; and for 16 years he studied, traveled and observed the workings of other governments. In 1847 he, with Count Balbo, founded a newspaper in favor of a freer form of government for Sardinia, based on that of England. A year later he entered Sardinian politics, was made premier in 1852 and until his resignation in 1859 was the originator and director of the Sardinian policy. He greatly improved the financial condition of the country and made Sardinia a power of some account in Europe. It was through his advice that Sardinia took part in the Crimean War, and this gave him a chance to bring the question of unity for Italy before the nations of Europe. In 1858 he had a secret meeting with Napoleon III and drew up a plan for driving Austria out of Italy, which resulted in breaking the power of Austria in the Italian peninsula; but Cavour was so disappointed at her being left in possession of Venetia by the peace of Villafranca that he resigned. But the next year found him in office again, striving to attain his object more earnestly than ever, and this time more successfully. Parma, Modena and Tuscany came into union with Sardinia under King Victor Emmanuel. He secretly encouraged the expedition of Garibaldi, which freed Sicily and southern Italy. In 1861 an Italian parliament was summoned and Victor Emmanuel made king of Italy. Rome and Venetia only were wanting, and they were won with a little patience. The strain, however, was too much for him, and he died on June 6, 1861. His last words were: "Brothers, brothers, the free church in the free state."

Cawnpore (*kạn'pōōr'*), a city of India, on the Ganges, 42 miles southwest of Lucknow. It became a British possession in 1801, and is now a garrison town for British troops. Cawnpore also is a district in the Allahabad division of the northwest provinces of British India. At the outbreak of the mutiny in May, 1857, there were 1,000 Europeans in Cawnpore, 560 of whom were women and children. Behind hastily thrown up intrenchments the few defenders held out for three weeks against the overwhelming numbers of mutineers led by Nana Sahib, when they surrendered on promise of a safe-conduct to Allahabad. The Sepoys marched the men to the banks of the Ganges, but hardly had the prisoners embarked, when the Sepoys opened fire on them and only four escaped. Hearing that General Havelock was within two days' march of the place, Nana Sahib went to meet him, was driven back, and, on reaching Cawnpore, in his rage he ordered the women and children to be massacred at once. Dead and dying they were thrown into a well. A memorial arch was erected over the intrenchments and a mound raised over the well. Population, 197,170.

Caxton, William, the first English printer, was born in Kent about the year 1422. He served as an apprentice and prospered in business. About 1476 he set up his wooden printing press at Westminster. He had learned to print at Bruges, and in 1474 printed there the first book issued in English, but the *Dictes and Sayings of the Philosophers*, brought out in 1477, is the first book certainly known to have been printed in England. His industry was wonderful. His own translations filled more than 4,500 pages, while his press turned out over 18,000 folio pages. The books he printed are to-day held as great rareties, and the few copies still left are worth many thousand dollars each. He died in 1491 or 1492.

Cayuga (*kā-yōō-gȧ*) **Lake**, an attractive body of water in central New York on which the towns of Ithaca, Aurora and Cayuga are situated. The lake has a high elevation, and is drained by the Seneca and Oswego Rivers into Lake Ontario. It is about 35 miles in length, varies from one to three miles in width, and is traversed in the season by steamers plying on it between Ithaca and Cayuga Bridge. It is the resort of many tourists and summer visitors.

Ce'dar (*sē'dẽr*), species of the genus *Cedrus*, which belongs to the *Conifers.* They are large and ornamental trees, being native to northern Africa, Asia Minor and the Himalayas. The great durability and firmness of the wood are highly esteemed qualities. The native African species, *C. Atlantica*, is the only one hardy enough for cultivation in the northern states. The cedar of Lebanon, *C. Libani*, is well-known, in maturity forming a tree with broad head, differing decidedly in appearance from the pyramidal form of the African species. Although true cedars are not native to America, there are several native conifers which are commonly called cedars. For example, *Thuja* is known as *arbor vitæ* or white cedar; *Chamæcyparis* is called southern white cedar; while a species of juniper (*Juniperus Virginiana*), with odorous red wood, is universally known as red cedar and is used in large quantities in the manufacture of lead pencils.

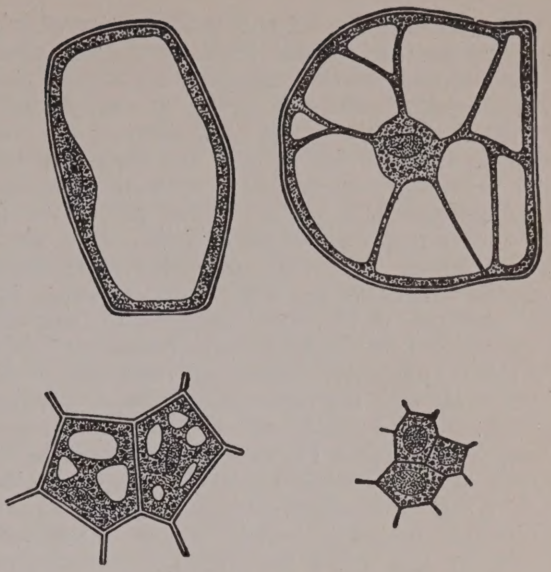
Cedar Mountain, a cone-like hill in Culpeper County, Virginia, where was fought a spirited battle, Aug. 9, 1862, between the Union troops under Gerneral Banks and the Confederates under General Jackson. Near evening Banks fell back to join supports forwarded by General Pope, who was in command of the Army of Virginia, leaving the Confederates in possession of the battlefield. The Confederates did not keep their ground, but, falling back, joined the main force under Lee two days later. The Confederate loss was 1,314; the Union loss about 1,800.

Cedar Rapid or **The Cedars.** An extensive rapid on the St. Lawrence River, now avoided by the Soulanges Canal, and the name of a village on the northern bank of the river, in Soulanges County, Quebec. Here Capt. Forster with a small band of regulars and Indians captured the garrison of 400 Americans in their retreat from Quebec in May, 1776. A force under Maj. Sherburne was also defeated after a spirited engagement, and the survivors made prisoners.

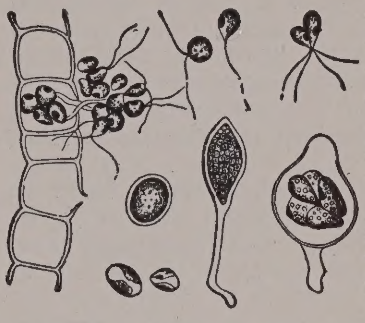
Cedar Rapids, Ia., a city in Linn County, on Cedar River. It is a considerable railroad-center, and has a number of machine-shops, employing about 1,000 men. The water-power utilized by its manufactories comes from the Cedar River. Its industries are pork-packing and the manufacture of flour, pumps, furniture, agricultural implements, starch, creamery, egg and dairy products. Cedar Rapids is the home of the American Cereal Co. and the Pawnee Cereal Co., which together have a daily capacity of thousands of barrels of cereals and give employment to hundreds of people. The city has the service of four railroads, excellent public schools, a public and also a Masonic library, etc. Population, 52,000.

Celebes (*sĕl'e-bēz*), an island possession of the Netherlands in the East Indies, lying between Borneo on the west and the Moluccas on the east. It was first visited by the Portuguese in 1512, but in 1660 was taken and occupied by the Dutch. The center and north of the island are mountainous, and have deposits of gold, copper, tin and diamonds. It is rich in forest wealth and its vegetation is luxuriant. The area of Celebes is 49,390 square miles, with an estimated population (1925) of 2,200,000. Among its chief products are coffee, sugar, indigo and tobacco. The capital is Macassar, situated on the southwestern peninsula. The Celebes Sea, on the north of the island, separates the latter from the Philippines; the Strait of Macassar on the west separates it from the island of Borneo.

Cell (in plants), the unit of structure in the bodies of plants and animals. The bodies of the smallest plants consist of a single cell, while those of the more complex plants consist of very many cells. The free cell is approximately globular in outline, but if pressed upon by neighboring cells it may become variously modified in form. Bounding the ordinary plant-cell, there is a thin elastic wall composed of a substance called cellulose. This cell-wall forms a delicate sac within which there exists the living substance called protoplasm. It is this substance which is alive and works, and has really formed the cell-wall about itself. The protoplasm of a living cell is organized into various structures, which have different duties. One of the most conspicuous structures is a more compact mass of protoplasm, usually of spherical form, which is called the nucleus. The nucleus is imbedded in the less dense protoplasm, which receives the general name cytoplasm. In addition to its power of growth the living cell is also able to divide itself into two cells. The process of ordinary cell-division is an exceedingly complicated one, and is known as mitosis or karyokinesis. It is this power of self-division which enables a single cell, such as an egg, to produce eventually a complex body composed of numerous cells. JOHN M. COULTER.



PLANT CELLS OF DIFFERENT AGES

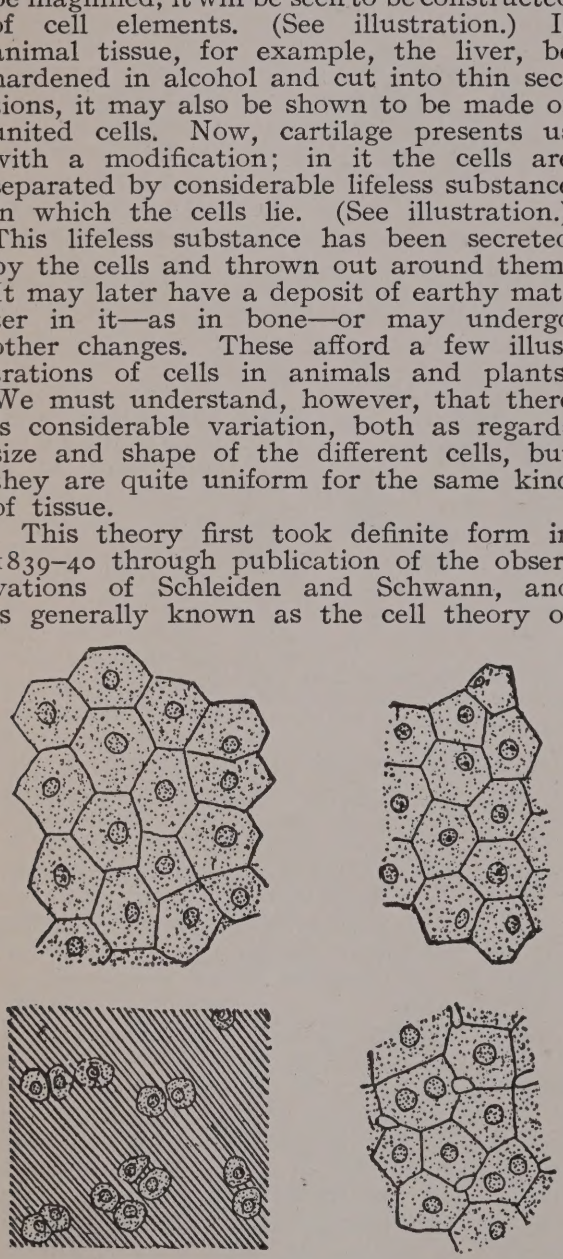


ULOTHRIX, SHOWING THE FORMATION, ESCAPE AND BEHAVIOR OF SWIMMING CELLS

Cell = Doctrine, the doctrine that all the tissues of animals and plants are constructed of cells. It unites living beings on the broad ground of similarity of structure, and, for the understanding of animals and plants, is one of the most important advances of the nineteenth century. The cells are the little particles that are fitted together to make the tissues, and, therefore, we may speak of them as the bricks of organic architecture. Not only are the parts of animals and plants constructed of cells, but every living being, no matter how complex, arises from a cell. The doctrine, therefore, is a broad one, and tends to unify knowledge.

Let us see some of the facts upon which this conclusion rests: If a very thin slice of a plant-stem be examined under the microscope, it will be found to be constructed of small units fitted together. If the outer epidermis of a leaf be stripped off and properly magnified, it will likewise show cellular structure. (See illustration.) By extending our observations, any part of the plant may be proved to be constructed of cells or their derivatives. In like manner, if the epidermis of an animal be magnified, it will be seen to be constructed of cell elements. (See illustration.) If animal tissue, for example, the liver, be hardened in alcohol and cut into thin sections, it may also be shown to be made of united cells. Now, cartilage presents us with a modification; in it the cells are separated by considerable lifeless substance in which the cells lie. (See illustration.) This lifeless substance has been secreted by the cells and thrown out around them. It may later have a deposit of earthy matter in it—as in bone—or may undergo other changes. These afford a few illustrations of cells in animals and plants. We must understand, however, that there is considerable variation, both as regards size and shape of the different cells, but they are quite uniform for the same kind of tissue.

This theory first took definite form in 1839–40 through publication of the observations of Schleiden and Schwann, and is generally known as the cell theory of Schleiden and Schwann. But cells, especially those of plants, had been observed long before this time. Robert Hooke, the English botanist, in 1665 described the plant-tissue in cork as made up of "little boxes or cells distinct from one another." Malpighi the Italian, Leeuwenhoek of the Netherlands and Grew of England all made sketches within a few years of this date, to show the cellular structure of plants. These, however, were individual observations, and Schleiden's great step consisted in applying the idea to all plants without exception; and Schwann made a general application to animal tissues. Both these men had a wrong idea regarding the cells. They thought of them as "box-like compartments," something like the cells in honeycomb or a wasp's nest, and, therefore, looked upon the cell-walls as important; but the idea of the cell changed and gradually came to mean the living particles instead of little boxes. Within the cavity of the cell is a jelly-like, viscid substance that is actually alive while the cell-walls are lifeless. The living substance is protoplasm, and in due time a cell came to be defined as a small mass of protoplasm containing a nucleus, for a nucleus or denser portion of protoplasm was found in all living cells. Finally, about 1860, the original idea of Schleiden and Schwann was completely replaced by the true one. Max Schultze did more than any other one man to establish this idea, which is called the protoplasm theory; but the work was greatly aided by De Bary the botanist and Virchow the pathologist.



Cells from Epidermis of frog (upper left); Epidermis of leaf (upper right); Cartilage showing matrix (lower left); and liver (lower right).

In the meantime, a new discovery had been made and partly perfected, viz.: that the egg is a cell. It is a modified cell of the body of the parent, and, with this new fact in mind, we can account for the origin of cells in the body. The egg divides into 2, then into 4, 8, 16, 32 cells, and so on, so that what was a single cell becomes many, and each new cell is derived by division from a formerly living cell. The cells produced in this way become grouped into layers and, later, into tissues. As the tissues grow, the cells become changed, both in form and as regards the work they do, and so we have different kinds of tissue. Now, since all animals arise from eggs, the substance of the egg must contain everything that an animal inherits from its parents, and it follows that heredity, in the long run, is a question to work out on cells.

All activities have been shown, likewise, to take place in the protoplasm of cells; for example, the liver does not act as a whole, but each cell of which it is composed is doing a part of the work of the liver, and the combined action of all represents the work of that organ. This is the case with any other organ in the body, and, therefore, the cell is important in physiology as well as in anatomy and development. Many problems are to be solved by work on cells. The recent observations on cells have become close and technical, and cannot be dealt with here. See Wilson: *The Cell in Development and Heredity* (1900); Hertwig: *The Cell* (1895); Sedgwick and Wilson: *General Biology* (1895). Wm. A. Locy.

Cellini (*chĕl-lē′nē*), **Benvenuto,** an Italian goldsmith, sculptor and engraver and the author of a very interesting account of his own life, was born at Florence in 1500. When young, he went to Rome, where his skill in metal-work gained him the favor of many nobles. He seems to have been somewhat of a freebooter, besides an expert swordsman and stabber, and had few scruples about murdering any one he chanced to quarrel with. His book mentions many of his encounters. He usually got off scot-free, but the murder of a rival goldsmith brough him to prison. He was, however, in such favor as a metal-worker as to be quickly set free again. He was summoned to the court of France and he tells us how pleased Francis I was with a golden spice-box he made for him. But it was in Florence that he produced his finest piece of sculpture, the famous bronze, *Perseus with the Head of Medusa.* He began to write his life in 1558, which is of the greatest interest. Cellini was a shrewd judge of men, and gives a faithful and wonderfully life-like picture of Italian society in the 16tn century. He died in 1571.

Celluloid (*sĕl′ū-loid*), is a mixture of gun-cotton, camphor and various other substances. It is chiefly manufactured in the United States, most largely at Newark, N. J. Celluloid has many valuable properties. It is buff or pale brown in color, but it can be made as white as ivory or transparent. It can be molded or pressed into any form and turned, planed or carved. It is not affected by water or air. It can be hardened, and is then used for combs, piano keys and billiard balls. It can be colored to resemble amber or tortoise-shell. As an imitation of red coral, it is used in jewelry. Among the many articles made from it are knife-handles, buttons, napkin-rings, card-cases, thimbles, dolls, shirt fronts and collars.

Cel′lulose (*sĕl′ū-lōs*), the peculiar material which forms the original cell-walls of plants. See Cell.

Celsius (*sĕl′sĭ-ŭs*), **Anders,** a Swedish astronomer, born 1701, died 1744. Besides making some important geodetic measurements, he invented a scale of temperatures, known as the centigrade scale, which is now universally used in scientific work. The centigrade scale is defined by dividing the interval of temperature between melting ice and boiling water into 100 equal parts.

Celts or **Kelts,** an Aryan or Indo-European race that spread over Europe in early times. There seem to have been two migrations, the first Celts conquering and driving westward the native peoples, who were of the Ivernian race, and in turn being driven and conquered by the second horde of their countrymen. There was no common Celtic name by which all Celts were known to the Romans, but they were known as *Galli* or *Celtæ.* The Celts intermarried with the natives they conquered, and with the Romans and Saxons who conquered them; but some of them have remained more or less distinct, as the Irish, Bretons, Scotch Highlanders and Welsh. The language of the Irish and Scotch is called Gaelic; and a Gaelic dialect different from either of these, the Manx, is still spoken in the Isle of Man, while the Cornish dialect in the south of England, was spoken so late as a hundred and twenty-five years ago.

Cement (*sē-mĕnt′*), is any substance which without using mechanical rivets unites articles by solidifying from a soft or liquid condition. The most important cements are those which, when mixed with water, form a hard, stony mass. Mortar sets in open air, hydraulic cements under water. They are used with sand and broken stone in making concrete, for masonry exposed to water and for material in other situations that must possess exceptional durability. Stony cements may be natural, as lime and Roman cement, or artificial, as Portland cement. The latter was invented in England in 1824, is considered the strongest and best of the hydraulic cements, and is the chief cement considered in this article. In 1850 improved methods, with general recognition of cement's merit as a building material, ensured its commercial success. Then France and Germany took up the industry in earnest, and their scientific methods improved the processes and quality of the product. It arrived in America in 1865, began to be manufactured here in 1872, but did not number even 1,000,000 barrels a year until 1905. Its true value as a structural substance was undreamed of in 1882, and it has required a quarter-century for it to win universal use, but the annual consumption is now in the neighborhood of 100,000,000 barrels, and the future of cement in all construction, including artificial stone for house-building, appears assured.

Making Portland cement is a simple process. Rocks containing clay and lime are quarried, crushed and ground, and then burned in rotary kilns at 2,000° F. This cement-clinker, as the product is called, is cooled, crushed and reground to an impalpable powder. Then it is seasoned in dry bins, and finally about two per cent. of finely ground plaster-of-paris is added.

The vast use of cement is as concrete and reinforced concrete. Concrete is artificial stone made from broken granite, trap-rock or screened gravel (the sizes ranging from a walnut to an egg), clean coarse sand and cement. Sand fills the spaces between stones, cement those between grains of sand. The stone, gravel and (if strength be not indispensable) brick, cinders or terracotta form the aggregate, on whose character the concrete's final durability chiefly depends. Reinforced concrete is ordinary concrete in which iron or steel rods or bars are imbedded, and is needed if concrete is exposed to pulling or bending. In 1882 the employment of concrete was virtually confined to foundations and underground work, and reinforced concrete was undreamed of; but in 1885 the twisted bar was invented and the principle and method of reinforcing concrete demonstrated; and in 1906 buildings of reinforced concrete endured the California earthquakes practically unscathed. Now not only are huge warehouses, 800 feet long and nine stories high, built of concrete, but bridges, cellars, chimneys, cisterns, curbs, culverts, dams, drains, floors, hogpens, horseblocks, poultry-yards, porches, shingles, sidewalks, stalls, tanks and troughs.

Portland cement is the sole hydraulic cement that the builder of concrete blocks can seriously consider. Natural and slag cements and hydraulic lime, when exposed to dry air, are its inferiors in strength and durability. Moreover, the speed with which it hardens and develops its full strength would alone throw other cements out of consideration. The price of cement has, for years been lessening steadily, until now, at a fifth of a cent (wholesale) per pound, it is cheaper than stone in general, not seldom even cheaper than brick, while well-made construction cement equals the best stone. The combination of steel and concrete seems as nearly fireproof a composition as men may devise, and will, when generally employed, reduce insurance rates materially. In building on sandy soils, the stone or brick piers that are often built for considerable distance below surface as foundations are filled in with cement, and when this has hardened there practically is a huge single mass of stone. The buildings of the future are likely to consist almost entirely of steel and cement. When cement costs only five dollars a ton, the speediest means of building a house will be to make rough molds and cast the walls from solid cement. Then stone houses can be made for the cost of wooden ones. In view of the expensiveness of lumber already and the impending exhaustion of our forests, this fact is of incalculable importance. Edison is constructing iron molds and devising machinery to cast a full-sized house in twelve hours. At the end of six days the molds can be removed, and the house will be complete and, after drying six more days, be ready for occupancy.

Slag-cement also is coming into general use. Slag is a product of the blast furnace, resulting from the blending of iron ore and limestone. To the ironmaker it is so valueless that vast piles accumulate as waste. When it is suddenly cooled, dried and mixed with 25% of slaked lime, it forms a fine material for cement. Germany anticipated America in seeing the merit in slag-cement and in establishing factories for producing it. American manufacture of slag-cement began in 1902.

Pure white cement is now made. When mixed with white sand, white quartz and white marble or limestone, it produces pure white concrete. By the addition of small amounts of ordinary pigments to white cement, it yields concrete of brilliant, delicate and lasting colors.

Cemetery (*sĕm'ē̇-tĕr-ȳ̆*), (meaning a sleeping place), may mean any graveyard, but it has lately come to be applied to the large ornamental burial-grounds which have taken the place of the old custom of burying within and around churches. Western nations have got this idea from the Turks whose fine burial-grounds, especially around Constantinople, are famous and are dense forests of cypresses. A Mohammedan grave is never reopened, but after each death a cypress is planted. Paris was the first western city (in 1804) to set apart a modern cemetery, Pére la Chaise, which has become famous throughout Europe. The *Campo Santo* (Sacred Field) of Pisa, an oblong court surrounded by marble arches and adorned with noted frescoes and works of art and the *Campo Santo* of Genoa, with its wealth of sculpture, are both of them noted in Italy. There is an odd cemetery in Naples. In it are 366 deep pits, one of which is opened each day, and in it all the burials of the day take place, and it is not again opened until the same day in the following year. The park-like adornment of cemeteries has had most attention in the United States. The best known are Spring Grove at Cincinnati, Mt. Auburn near Boston, Greenwood in Brooklyn and Laurel Hill near Philadelphia.

Cenci (*chĕn'chē̇*), **Beatrice,** was the daughter of Francesco Cenci, a wealthy Roman nobleman. According to the popular story, the beauty of Beatrice awakened in him an evil love of his own daughter. The outraged girl, but 16 years old, in revenge planned with her stepmother and brother her father's murder, into whose brain two hired murderers drove a large nail. The crime was discovered, she and her brother were put to the torture, but, though the brother confessed, Beatrice maintained that she was innocent. All three, however, were beheaded. On the story Shelley founded his tragedy of *The Cenci.* Researches have shown that Francesco was not so bad as he has been painted, that Beatrice was not so beautiful and virtuous as she has been pictured and, lastly, that the sweet and mournful face that forms one of the treasures of the Barberini Palace at Rome cannot, as was thought, be a portrait of Beatrice by Guido, who never painted in Rome until nine years after Beatrice was executed (1599).

Census, meaning the counting of the people. The word is a Latin one and was first applied to the duty of counting the people, which was entrusted to the Roman censors. Solon also established a census in Athens. The first careful census of a European nation was undertaken by Sweden in 1749. A count was made in France in 1700, but the first reliable one was not undertaken until 1801. In America the first census was taken in 1790; in England in 1801. Censuses are now taken in the United States, England, India, most of the British colonies, Austria, Belgium, Italy, Norway, Sweden, Russia and Switzerland every ten years; in France and Germany every five years; in Spain irregularly. Hardly any two countries agree as to the subjects on which information is asked. Thus, some inquire whether there are in households infirm persons, blind, deaf and dumb, idiots, insane persons, persons who have been convicted of a crime; how many languages are spoken by the persons entered; how many are at school, how many vote, how many rooms and windows are in the house, and so on. Without being too inquisitorial, the design of the census-returns should at least afford information not only as to the vital statistics of a country or nation but as to its industrial and economic resources, including the extent and character of its chief industries, manufactures, mines, if any, and the growth and nature of its agricultural products. The United States census is the most important of any, as the representation of the states in the Lower House depends upon it. It was provided for in the constitution. It aims at giving a specially full view of the condition of the people, and is illustrated with maps on almost all the many branches of inquiry, such as the amount of land occupied by different crops and where various diseases prevail, as well as the indicated scope, extent and nature of its manufacturing interests, its mining resources, etc. The fifteenth (1930) census gives the United States a total population, including Alaska, Hawaii, Puerto Rico, Philippine Islands, and colonies, of 137,008,435. The census of the United States is printed in large quarto volumes, containing a vast amount of valuable information. The census bureau, organized as a permanent one in 1902, is under the Department of Commerce and Labor, and its periodic bulletins are of the utmost value.

Centaurs (*sĕn'tôrs*) (meaning bull-killers), a wild race of men, who lived in early times in the forests of Thessaly and spent their time in bull-hunting. Homer first tells about them, picturing them as savage, gigantic in stature and covered with hair. It was not until the time of the poet Pindar that they are spoken of as half-man and half-horse. In Greek myths these horse-centaurs are described as fighting with a people called the Lapithæ and with Hercules. The most famous was Chiron, who was the teacher of Achilles. When the Mexicans, who had never seen horses, first set eyes on the Spaniards on horseback, they believed that the horse and man together made one animal, or a centaur, as the Greeks would call it.

Centigrade Scale. See Celsius.

Centipede (*sĕn'tĭ-pēd*), any of the numerous myriapods of the order or sub-class called *Chilopoda;* the common hundred-legged worm of the warm regions. The centipede has the jointed appendages, antennæ or feelers, and air-tube method of breathing of the insect, although its form is that of a worm. It has an elongated, flattened body, divided into segments, each joint provided with a pair of legs, of which there are from twenty-one to twenty-three. The enlarged front joint forms the head. The centipede is active, predaceous, and chiefly nocturnal in habits. It is important as an insect destroyer. The largest centipedes live in the tropical regions and attain a length of eight to ten inches. They have forefeet modified into poison-claws, and their bite is fatal to small animals, and painful but not usually serious to man. They should be distinguished from the common millipedes of United States and Europe, although centipedes of five inches or more in length are to be found within the southern states, and easily distinguishable from the much smaller millipede.

Central Africa Protectorate. See Nyasaland.

Central America. See America.

Central Falls, a manufacturing city of Rhode Island, situated six miles from Providence, on the New York, New Haven and Hartford Railway. Central Falls was formerly a part of the town of Lincoln in Providence County, from which it was separated and incorporated as a city in 1895. It has many factories, foundries, and extensive cotton, woolen, thread and silk-mills, haircloth manufactories, and machine shops. The population, according to the census of 1930, is 25,898.

Central Park, one of the largest and the most famous of the public parks of New York City. The site, comprising 840 acres, was purchased in 1856, the general plan designed by F. L. Olmstead in 1857, and the park laid out in 1858. It lies at present in the heart of the city, two and one-half miles long and one-half mile wide, extending from 59th Street to 110th Street, Manhattan. For many years the largest park in New York City, it is now surpassed by Pelham Bay Park, extending over an area of 1,797 acres in the Bronx; Marine Park (1,234 acres), and Van Cortlandt Park (1,132 acres). The surface was originally rocky and swampy, requiring too great an expense to convert it into city lots. The marshes were made into lakes, the massive boulders and rockwalls used for picturesque driveways, and part of the bare rocky spaces covered with vegetation. The park gives the contrast of almost wild forest and mountain scenery to the brownstone city fronts of the bordering avenues. There were 150,000 shrubs and trees in the original park, which have been protected, and to which have been added beautiful gardens, and fine collections of palms, orchids and other interesting flowers and plants. The collection of wild animals is hardly second to any other in the world, and is housed in numerous dens, cages, tanks, wire enclosures, and buildings. The Metropolitan Museum of Art and the American Museum of Natural History occupy two large buildings in the park. Some other outstanding points of interest are the obelisk, casino, mall, and labyrinth.

See New York City.

Centralia, a city in Marion County, Illinois, is situated sixty miles southeast of St. Louis. It is served by the Illinois Central; Chicago, Burlington and Quincy; Southern, and Illinois Southern railways. It is situated in a fine fruit-growing region. Many coal mines are to be found in the vicinity. The car and repair shops of the Illinois Central Railroad are located in Centralia. Other important industries include the manufacture of envelopes, boxes, pick-handles, crates, glassware, and flour mills. Centralia was settled in 1852, incorporated in 1859, and granted a charter in 1872. Its charter has since been amended but still forms the basis of government. In 1930 the population was 12,583.

Centrifugal Force, the tendency of an object in motion to fly out of a curved path, as an object swung in a circle on a string. This force acting upon the object is directed toward the convex side of the curve and is the opposite of the centripetal force which must be exerted to keep the whirling object in its curved path. In particular, if a particle of mass m be moving in a circle of radius r with a uniform speed v, the centrifugal force is at each instant directed along the radius passing through the particle, and the amount of the force is $\frac{mv^2}{r}$. By Newton's Third Law, centrifugal force may be called action, and centripetal force, its negative aspect, reaction. The principle of centrifugal force is employed in mechanical dryers in laundries, in machines for clarification and filtration, in sugar refineries, and for separating cream from milk.

Century of Progress, A, the World's Fair held in Chicago from May 27 to November 12, 1933, and reopened on May 26, 1934. There have been but two exceptionally successful expositions of this kind held in the United States and both have been in Chicago. In 1893 the great World's Columbian Exposition was held here and set a record of over 21,000,000 paid admissions. A Century of Progress surpassed the earlier exposition, however, in the number of people who attended it, the total number of paid admissions being 22,320,456.

The site of the Exposition parallels the shore of Lake Michigan for a distance of nearly three miles, from Roosevelt Road (Twelfth Street) to Pershing Road (Thirty-ninth Street). Northerly Island, built in the lake especially for the Exposition, extends from twelfth to Twenty-third Street. The Exposition's modernistic buildings were constructed along the shore and on this island. The great "thrill feature" of the Fair was the "Sky-ride," one of the twin towers of which rises on the island and the other on the mainland near the north entrance. These twin towers are constructed of steel. They are each 628 feet high, and stand 2,000 feet apart. Steel cables to carry rocket cars between the towers are 200 feet above ground. The Paris Exposition had its Eiffel Tower; the Columbian Exposition its Ferris Wheel, and A Century of Progress its Sky-ride.

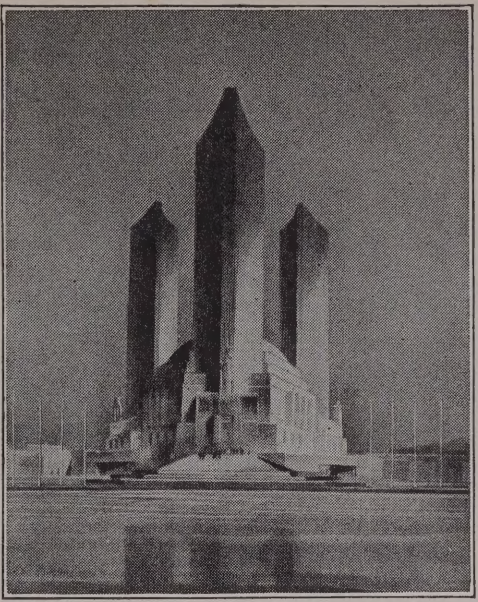
Among the unusual modernistic structures is the Federal Building. Three fluted towers 150 feet high rise around the seventy-five foot dome. These towers are triangular and the inner face of each is curved. They represent the three branches of government—legislative, executive and judicial. Unusual lighting effects made the towers stand out at night. In juxtaposition to the Federal Building is the Hall of States, in which a great many of the states of the Union had interesting displays.

Adjacent to the exposition are the huge open air stadium known as "Soldiers' Field," the Field Museum of Natural History, the Shedd Aquarium, and the Adler Planetarium. Within the grounds was erected the great Hall of Science. Here the marvels of scientific progress during the past century were unfolded to the view of millions of visitors. The carillon tower at one end of this building was strikingly illuminated with neon lights.

Another unusual building and one that strikes a new note in architecture is the Travel and Transport Building with its "sky-hung" dome. It is larger than the dome of St. Peter's in Rome or of the Capitol at Washington, D. C. The roof is formed of metal plates suspended by steel cables hung from a circle of twelve steel towers, and anchored by huge slabs of concrete. This building is an odd appearing structure, the first to the built on the principle of the suspension bridge. The dome is 125 feet high and 200 feet across, without a single arch, pillar, beam or any support whatever to break its expense. Expansion joints allow the metal plates which form the roof to slide over each other, as changes in temperature, wind velocity, rain or snow, cause differences in circumference of as much as six feet.

The cost of erecting and presenting a Century of Progress in 1933 was in excess of $38,000,000. According to an estimate of the final audit made by M. M. Tveter, controller of the Exposition, a profit of more than

$6,000,000 was realized during the five and one-half months the Fair was in operation. The profit was over and above all operating expenses and interest on the fixed investment, fifty per cent of which had been retired by the close of the exposition in 1933. At the conclusion of the Fair, approximately $1,000,000 remained in the working cash fund. This money, plus sums that would accrue from new contracts and the sale of space, was to be used for the rehabilitation of the Fair before the reopening in 1934.



THE FEDERAL BUILDING

The three towers represent the executive, legislative and judicial branches of the government.

Total gate receipts, including pre-season sales, amounted to $10,345,848, while the concessions grossed $26,084,777. Of this latter amount, the Fair received $2,967,418, plus $785,502 from the sale of concession space. Revenue from a gold-note issue of $9,735,900, a World's Fair association membership drive and other sources brought the total revenue for the season up to $30,032,326. Disbursements, including a fifty per cent payment on the gold-note issue and the payment of interest on the entire issue, plus operating expenses, accounted for a total of $28,728,821. The estimated excess of receipts over disbursements was $1,303,503 for 1933.

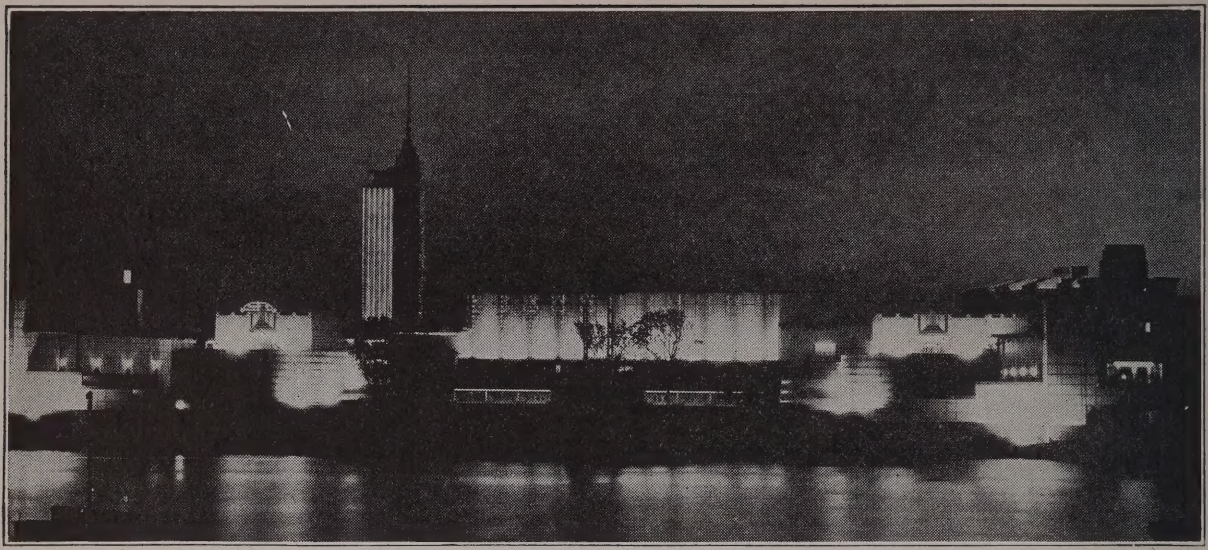
A Century of Progress was reopened on May 26, 1934, by Rear-Admiral Richard E. Byrd, from his lonely shack for meteorological observations at the South Pole. The electrical impulse flashed by short-wave radio was routed via Little America, Buenos Aires, and New York to the Exposition grounds where it turned on a pyrotechnic display in the Lagoon theater, in which his greeting was spelled out in fireworks.

An additional $6,000,000 was spent, largely on parks and gardens, for the 1934 Exposition. The basic idea of emphasis on the service of science to humanity was retained, with many of the 1933

Chicago Aerial Survey

AN AERIAL VIEW OF A CENTURY OF PROGRESS

The great Chicago "loop" with its tall buildings may be seen in the background. The steel towers of the "Sky-ride" are apparent, and in the foreground is shown one of the two "blimps" which carried passengers over the Exposition.



Kaufmann & Fabry

A NIGHT VIEW OF THE HALL OF SCIENCE

The building which housed the marvels of scientific progress as it appeared from the East, illuminated with Neon lights in blue and rose. The tower contained a carillon.

exhibits, and renewal of contracts by seventy-five per cent of the 1933 industrial exhibitors. The color scheme was entirely changed, and new illumination used throughout the grounds, with different decoration of the lagoons and a number of important water spectacles built out from the shores and bridges.

The Midway was replaced by the Street of Villages. These representative villages were careful reproductions in architecture and atmosphere, duplicating a number of world famous buildings and features of foreign lands. Among the additions were Ireland, Italy, Spain, The Netherlands, Colonial America, Mexico, Switzerland, the Black Forest, and Old England. Exact constructions of sections of famous roads of history also added to the international aspect of the 1934 Fair. Many new exhibitors among the leading corporations of America were added, some of which erected new buildings, as that of Henry Ford with its adjacent gardens. The musical program was greatly aided by the Ford and Swift shells where symphony concerts were given.

On July 10, 1934, Mrs. Franklin D. Roosevelt, First Lady of the Land, unveiled two pictures, the "Song of the Lark" by Jules Breton, and "Pulaski in the Battle at Savannah" by Stanislaus Batowski. These pictures were part of the 1934 collections of the official art exhibition, housed in the Art Institute.

Cephalization (*sĕf-ȧ-lĭ-zā'shŭn*), the dominance of the head in animal life; the localization and enlargement of important organs, funcions, and parts in or near the head, characteristic of segmented animals. It is evidence of evolution toward higher organization. In the earlier forms of metameric life cephalization was only slightly distinguishable, as the head was very little different externally from the other segments, and formed by only two or three metameres. The principal sense organs, however, were located in the head, and the central nervous system enlarged there to form a rudimentary brain. With the higher forms of animal life, the number of metameres in the head is increased. There are six head metameres in crayfish, the same number in most insects, and from nine to thirteen in vertebrates. More and more, in the higher metameric animals, the head takes on the chief sensory and psychical functions. The sense organs become concentrated at the head, and are enlarged, and the nerve centers there become more important. The brain is developed, the head becomes larger; yet the organs located there are more closely related, making the head a unit controlled by the extremely delicate, but intricately powerful brain.

Cephalonia (*sĕf-ȧ-lō'nĭ-ȧ*), or **Kefalonia, is** the largest of the seven Ionian Islands in the Mediterranean Sea. It is situated opposite the entrance to the Gulf of Lepanto, or Corinth. Irregularly shaped, Cephalonia is thirty-two miles long, and covers an area of 456 square miles. The surface is mountainous, rising to a height of 5,313 feet in Mt. Ainos. In spite of the thin soil and lack of water, currants, grapes and olives are cultivated extensively. The chief exports are wines, currants, and olive-oil. The island was called Same or Samos by Homer, and later given the name Cephallenia. It was conquered and possessed in turn by Athens, Rome, the Byzantine Empire, the Normans, and Venice. The Turks repeatedly seized it from Venice, but when the Venetian Republic fell in 1797 it was taken by the French. Cephalonia was transferred to Great Britain in 1809, and ceded to Greece in 1864. It was an important post of British and French forces during the winter of 1915, in the World War. The capital is Argostoli. According to the census of 1928, the population is 66,414.

See CEPHALUS.

Cephalus (*sĕf'ȧ-lŭs*), a character in the folk literature of Athens, grandson of Æolus, and husband of Procris. Procris, suspecting him of infidelity, spied upon him; and Cephalus, not knowing her identity, murdered her. He was punished for his crime, although it was unintentional. Afterward, he settled on the island which was named for him *Cephallenia*.

See CEPHALONIA.

Cepheus (*sē'fŭs*, or *sē'fê-ŭs*), a constellation situated between Cygnus and the north pole. It is also known as the *Monarch*. Its head is in the Milky Way, and is marked by a triangle formed by three stars of the fourth magnitude. Its principal star, Alderamin, is of the third magnitude. It is named from Greek mythology, which relates that Cepheus, an Ethiopian king, and father of Andromeda, was placed among the stars after his death.

Ceracchi (*chā-rä'kē*), **Guiseppe**, an Italian sculptor, was born in Corsica about 1751. He studied under Righi, and in 1775 began to work in the studio of Carlini in London. He made part of the decorations for Somerset House, and many busts, including one of Sir Joshua Reynolds. In 1790, while on a visit to America, he completed busts of Washington, Franklin, and Hamilton. The former was placed in the Boston Athenæum, and the two latter in the Pennsylvania Academy. He designed a monument of Liberty, but Congress refused funds for its completion. Ceracchi was next employed by the Austrian court. In 1796, in Milan, he carved a bust of Napoleon, in recognition of which the First Consul invited him to Paris. In 1798 he helped to establish the republic of Rome. In Paris, however, Ceracchi joined a group of conspirators to assassinate Napoleon. One of the group betrayed the others to Fouché, and Ceracchi was arrested at the opera November 9, 1800, and executed in 1802, with all of his fellow conspirators but one. A disciple of Canova, his work was excellent and his death a great loss to sculpture.

Ceramics (*sē-răm'ĭks*), the art of making objects of baked clay. The two principal divisions of the subject are: (1) the technique and (2) the product. The word comes from the Greek *keramos*, meaning "potter's earth." The objects may be made from clay or from an artificial mixture of clay and minerals, baked to insure hardness and durability, and usually decorated. As a comprehensive term, ceramics includes all pottery, porcelain, earthen and stoneware, china, brick, and tile. The term, however, is more accurately applied to artistic utensils and decorated wares, treated in colors by glazing and firing. It is one of the oldest of all the arts and includes such beautiful work as Majolica and Japanese ware, the famous faience of Limoges, Balleek china, and the porcelains of Worcester, Doulton and Sèvres. The art comprises the designing of forms, the shaping of articles, and also the ornamentation by means of painting, glazing, and enamelling.

Bone or "standard" porcelain came into use in all English factories in 1800. In that year the son of Josiah Spade began the use of a simple mixture of bone-ash, china stone and china clay. This porcelain withstood all competition because of the low price of its production. The principal art products of Great Britain are Royal Worcester and Crown Derby wares. Other important British potteries are the Wedgewood, Minton, and Copelands and Doultons stoneware potteries. Many imitations of old ceramics are produced in Italy. In France, Theodore Deck and Taxil Dout are the most important of creative ceramic artists. In this day France has perfected the technique of modern faience and beautiful painted decoration. Limoges is a leading porcelain centre. The American factory of Haviland is situated here.

See LIMOGES; POTTERY.

Cerberus (*sûr'bē-rŭs*), the fabulous watchdog who guarded the entrance to the lower world of Hades, is generally described as a monster having three heads. The twelfth and final labor of Hercules was to drag forth Cerberus to the light of the upper world, and that without use of a weapon. Orpheus, lacking the strength of Hercules, is said to have lulled Cerberus to sleep with his lyre on his journey to Hades for the lost Eurydice. Milton speaks of Melancholy as "of Cerberus and blackest midnight born" (*L'Allegro*).

Ceraunograph, an instrument for recording lightning discharges. The instrument uses some form of wireless receiver, and indicates the discharges by means of the Hertzian waves they produce. Ducretet, in June, 1898, made the earliest recorded long-distance observations of lightning by this means. In 1900 the first trial ceraunograph was perfected by Father F. L. Odenbach, of Cleveland, Ohio. Professor Turpain of the University of Poitiers made several such instruments. He improved the ceraunograph by enabling it to secure a photographic record of the relative intensity of the discharges.

Cereals, the species of grasses which are cultivated for their seed, used as food. This includes all the plants which produce grain or corn. The term is derived from the goddess Ceres, who rules the grains and the harvest. The cereals do not belong to any particular group of the great order of grasses, but seem to have been selected as bread-plants chiefly because of the superior size of their seed, the facility by which it might be procured, or the ease with which it might be freed from its inedible envelopes. Cereals have been cultivated from time immemorial. The most extensively cultivated grains are wheat, barley, rye, oats, rice, maize or Indian corn, millet, and dura or Guinea corn. Buckwheat is now also widely cultivated. Barley, oats and rye are the grains of the coldest regions, as the first two will grow even within the Arctic circle. In the warmer regions wheat, maize and rice are popular, and the latter two are extensively cultivated within the tropics.

Ceres (*sē'rēz*), the Roman goddess who protects agriculture and the fruits of the earth. Her first temple in Rome was built in 496 B. C. to ward off a famine with which the city was threatened. A great festival with games, called *Cerealia*, was set up in her honor.

Cerro Gordo (*sĕr′rô gôr′dô*), a mountain-pass in Mexico, on the main highway to the City of Mexico. Here was fought a battle between the Americans and Mexicans, April 18, 1847. General Scott's force was 8,500, and Santa Anna's over 12,000. The engagement lasted from sunrise until 2 P. M., the Americans conquering with a loss of but 431 killed and wounded. The Mexican loss was from 1,000 to 1,200, with 3,000 prisoners, including five generals. Stores and artillery were surrendered.

Cervantes Saavedra (*ser-văn′tēz sä-ä-vā-drä*), **Miguel de,** the author of *Don Quixote*, was born in 1547, of an old and noble Castilian family. In 1569 we find some effusions of his on the death of the queen, that show he had begun to be a writer; but the next year we find him in Italy enlisted as a soldier and receiving three gunshot wounds at the battle of Lepanto. Coming home to Spain, he was captured by pirates, carried to Algiers and enslaved for five years. He made four daring attempts to free himself and his companions, but only regained his liberty by his family beggaring themselves to raise the large ransom demanded. He now began to write plays, which were not very successful and are all forgotten, except *Numancia*, which is acknowledged to be the most powerful tragedy in the Spanish language. In 1605 he brought out the first part of his great book, *Don Quixote.* It at once gained the greatest popularity, and the next year, in all the pageants throughout the country, men dressed to represent Don Quixote and his faithful Sancho Panza paraded the streets. Strange to say, Cervantes himself never thought it a great book; certainly no great book was ever written so carelessly. He worked at it by fits and starts, sending it to the printers without revising it and then laughing at their and his own blunders. Nor did he take the trouble to bring out the second part for ten years, though all this time he was a busy writer; and only at last published it because somebody else had written a false second part. Cervantes, who knew what real bravery was, wrote *Don Quixote* to make fun of the mock bravery that strutted about in the guise of chivalry; but he also, before the book was finished, took the liberty of laughing at a great many other foolish things. Cervantes died at Madrid, April 23, 1616.

Cervera (*thâr-vä′rȧ*), **Pascual,** a Spanish admiral who figured prominently at the outbreak of the Spanish-American War, was born at Madrid, in 1832, of a family of naval heroes. Early in his career he saw service in Morocco, in Cochin-China, in the Philippines and in the Spanish blockade of Cuba in 1870. He was, for a time, a naval attaché of Spain at Washington, and subsequently rose to the rank of rear-admiral. When war broke out with Spain, Cervera, with an inefficient squadron was ordered by his government to Cuban waters, and in May, 1898, was blockaded in Santiago harbor by a United States fleet. Realizing that he could make no effective defense, he determined to run the blockade, but was overtaken and his ships were destroyed. His flagship, the *Maria Teresa*, took fire in the contest and had to be beached. Cervera, escaping on a life-raft, was rescued and taken on board the *Gloucester*, where he surrendered and was held a prisoner of war until the peace protocol was signed, in August, 1898. He died in 1909.

Cetewayo (*kȧ-chwä′yō̍*), a noted Kafir chief, king of the Zulus, who in 1878 rebelled against British suzerainty, and in the following year annihilated a British regiment at Isandula, South Africa. Later in the same year Cetewayo was defeated by the British under Lord Chelmsford at the battle of Ulundi, taken prisoner and held captive till 1882. In that year he was brought to England, and there lionized by the Liberals, who were in favor of local autonomy in South Africa. The attempt was afterward made to reinstate him as king of Zululand; but having lost favor with his people, he was kept by the British at Ekove until 1884, when he died.

Ceylon (*sē̍-lŏn′*), an island and British colony in the Indian Ocean, southeast of India. Its greatest length is 266 miles; its greatest width 140 miles; area, 25,332 square miles. The sea of sapphire-blue beating against tall rocks and the rich evergreen forests towering above, till they are lost in the clouds, make a picture that can vie with any scenery in the world.

Surface and Drainage. Rolling plains cover the most of the island, and in the south mountains rise 8,000 feet in height. There are but one important river and two natural harbors; but the breakwater, which has been built at the capital, Colombo, has brought the bulk of commerce thither.

Plants and Animals. Most of the great tropical plants and trees are found here, noticeably tree-ferns often 25 feet high, scarlet flowering rhododendrons and tufted bamboos. The largest animal is the elephant, usually without tusks. Of the natives, the most numerous are the Singhalese, who are believed to be colonists from the valley of the Ganges.

Products and Resources. The great exports are tea, coffee and cinchona bark. The gems of Ceylon are well known. Here are found sapphires, rubies, topazes, garnets and amethysts, while the pearl-fisheries form a great British monopoly.

People and Religion. The men look very womanish, with their delicate features, their earrings, their long hair brushed back from the forehead and held by combs and their waist-cloths like petticoats. The Singhalese are Buddhists and do homage to the footstep of Buddha on the top of Adam's Peak, while his tooth is carefully kept in a rich shrine. Good work is being done in Ceylon by Christian missions and schools.

History. In the north of the island ruined cities have been discovered, bringing to light rock-hewn temples, cave temples, relic shrines which almost compare with the pyramids of Egypt and gigantic water-tanks on which an immense amount of labor must have been bestowed. The Portuguese settled on the island in 1517, but were driven out by the Dutch in 1658, who were in turn conquered by the British in 1796. The chief town is Colombo (population, 158,228). Population, chiefly Singhalese and Tamils, 3,592,397.

Chad, Lake. See Tsad, Lake.

Chadbourne (*chăd′bûrn*), **Paul Ansel,** an American educator, was born at North Berwick, Me., Oct. 21, 1823, and died at New York, Feb. 23, 1883. In 1848 he graduated at Williams College, where he was subsequently professor of chemistry and botany, and conducted some scientific expeditions with its students in Florida, Newfoundland, Iceland and Greenland. In 1867 he became first president of the State Agricultural College at Amherst, Mass., and, though he left this post to assume other duties, he returned here in 1882 and spent his last years in its work. In the interval he was successively president of Wisconsin University and of Williams College, of the latter of which he was an LL.D. He was also a licentiate in the ministry, and held the degree of D.D. from Amherst. He published a number of works, chiefly consisting of courses of lectures before the Lowell institute and the Smithsonian institution and of baccalaureate sermons and addresses. These include *Natural Theology*; *Instinct in Animals and Men; Relations of Natural History to Intellect, Taste, Wealth and Religion; The Strength of Men and the Stability of Nations*, etc.

Chaffee, Major-General Adna Romanza, United States army, in command of the American military contingent in China that acted with the Japanese and European troops in the advance (August, 1900) on Pekin, for the relief of the besieged legations at the capital. Born April 14, 1842, at Orwell, Ohio, he entered the army in 1861; became lieutenant in 1865 of the Sixth cavalry, major of Ninth cavalry in 1888 and lieutenant-colonel of Third cavalry in 1897. He gained a lieutenancy for gallantry at Gettysburg and a captaincy for gallantry at Dinwiddie Court-House, Va. He was made major and subsequently lieutenant-colonel for gallantry against the Indians in Texas and Arizona; appointed brigadier-general in 1898 of United States volunteers; and served in the Santiago campaign and was made major-general of volunteers in July of the same year. In 1900, at the outbreak of the Boxer riots in China, he was appointed to command the United States troops acting with the European allies in the advance from Tien-tsin to Pekin. In 1901 he was made major-general in the United States army, and placed in command of the forces in the Philippines, of which he was appointed military governor. In 1904 he was promoted to lieutenant-general and appointed chief-of-staff. He was retired from the army in February, 1906. He died November 1, 1914.

Chagos (*chä′gŏs*) **Islands.** These are largely islets and dependencies of Mauritius. The largest of them, Diego Garcia, lies in 7° south latitude and between 72° and 73° east longitude, and is 12½ miles long and 6¼ broad, with 526 inhabitants.

Chaillu, Paul du. See Du Chaillu.

Chalazogamy (*kăl′a-zŏg′a-mĭ*), in plants. In ordinary angiosperms the pollen tube, having passed through the style, enters the micropyle of the ovule and so reaches the egg. In certain dicotyledons, as walnut, birch, alder, etc., it has been found that the pollen-tube does not enter the micropyle, the natural passageway to the egg, but penetrates directly through the external parts of the ovule and burrows its way to the egg from the side or from beneath. The name has been given from the fact that the basal region of the ovule is known as the chalaza, which is at the opposite end of the ovule from the micropyle. The habit is a curious one, and its significance is not clear.

Chalcedony (*kăl-sĕd′ō-nȳ*), a beautiful mineral. It is a variety of quartz, with a mixture of opal. It was found abundantly near Chalcedon, in Bithynia, which gave it its name. It is found lining or wholly filling cavities in old rocks, like the basalt rock of Scotland, Iceland, etc. Chalcedony composes the whole or main part of many agates. It is generally translucent, has a waxy luster and is usually white or bluish white; sometimes reddish or milk white; more rarely gray, blue, green, yellow, brown or black. Chalcedony is much used in jewelry for brooches, necklaces and ornaments of all sorts; and large pieces are often made into little boxes, cups, etc. The people of olden times prized it highly, and many beautiful engraved specimens can be seen in museums. Petrified plants are sometimes found in chalcedony, in which they seem to have been incased while it was forming. Sometimes a specimen with a little water inside is discovered.

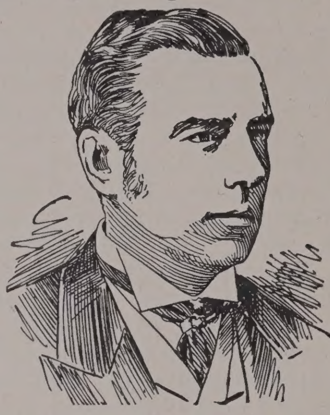
Chaldæa. See Babylonia.

Chaleurs (*shȧ-lẽr′*), **Bay of,** extends westward in between the provinces of Quebec and New Brunswick. It forms more than half of the northern boundary of New Brunswick. Said to have neither shoal or reef. Its fisheries (salmon, cod, herring, mackerel and lobster) are very important.

Chalk. Chalk is a variety of soft limestone, made up chiefly of the shells of microscopic sea-animals, called *Foraminifera,* which in life swim at or near the surface of the water. After the death of the animals their shells sink to the bottom. A cubic inch of chalk has been estimated to contain more than 1,000,000 shells. With the shells of the *Foraminifera* shells of other animals are sometimes mingled. In certain periods of the past these minute shells have accumulated in such numbers as to make beds scores of feet in thickness over great areas of the sea-bottom. Some portions of the sea-bottom on which these chalk-beds accumulated have subsequently been converted into land by uplift, so that chalk-formations now occur on the continents. Oozes similar to chalk are now accumulating on some parts of the ocean-bed. Contrary to the earlier belief, the chalk-formations known on the land were made in shallow, not in deep, water. The chalk of our country is found principally in the western plains, from Texas to Nebraska. In foreign countries it is found especially in France and England. Most of the known chalk was formed in the Cretaceous period (see GEOLOGY). In color it is usually white or whitish, and in composition it is chiefly carbonate of lime. Chalk is used extensively in the arts and to a slight extent in medicine Various other substances, such as red chalk, yellow chalk, black chalk, French chalk, etc., which are soft and will make a mark, as on a blackboard, are erroneously called chalk.

Chalmers (*chăl′mẽrz*), **Thomas,** a Scottish divine, was born in Fife, Scotland, March 17, 1780. He was graduated at St. Andrews University, and began to preach when but 19 years old. What made him the earnest Christian leader he became was the careful study he made of Christ's divinity, when asked to write an article on the subject for an encyclopædia. Then his great genius broke forth like the sunshine. Called to the Tron church, Glasgow, his oratory took the city by storm; visiting London, his preaching soon made him as well-known as at home. To wrestle with the ignorance and vice of Glasgow, he became minister of St. John's parish, with its 2,000 families of work-people. Here he set up day-schools and 40 or 50 Sunday-schools. The authorities left him the whole management of the poor in his parish, and in four years he reduced the amount expended on paupers from $7,000 to $1,120. This work ruined his health, and he left it to take a professorship in St. Andrews and, afterward, in Edinburgh. He felt very strongly on the questions that then divided the Scottish church, and, followed by 470 clergymen, he led a secession movement and founded what is known as the Free Church of Scotland. All his life he was a busy writer. His works extend to 34 volumes, mostly on theological, Christian and social subjects. As a pulpit orator he was unrivaled. Gentle, guileless and genial-hearted, he combined great brain-power and imagination with the shrewdest common sense. He died on May 31, 1847.

Cham′berlain, Rt. Hon. Joseph, an English statesman and M.P., for Birmingham West, was born in London, in July 1836, and educated at University College. He began his political career as an advanced Radical, was thrice elected mayor of Birmingham and was in 1876 returned to Parliament for that city, and represented it until the year 1885. In early life he was an active member of the firm of Messrs. Nettlefold & Co., screw manufacturers of Birmingham. In 1880 he became president of the board of trade in Mr. Gladstone's cabinet, and came into promimence as an able politician and forceful debater. Taking issue with his political chief on the subject of Irish home-rule, he in 1886 allied himself with the Conservatives. Though at first disliked by the latter, he afterward became their leader in the house of commons, where he was regarded as a fierce fighter and hard hitter as well as a man of great force and ability. He took office in the Tory ministry of Lord Salisbury as colonial secretary, and did much to promote colonial enthusiasm for the war with the Boers in South Africa, to bring about Australian federation and in his masterful way in Parliament to defend the Tory government for the mistakes and shortcomings in the Boer War. He was an earnest advocate of municipal reform and of the betterment of the condition of the working classes. He was lord-rector of Glasgow University. In 1888 he married, as his third wife, Mary, daughter of W. C. Endicott, formerly United States secretary of war. Age and ill-health withdrew him from many of his activities. He died July 2, 1914.



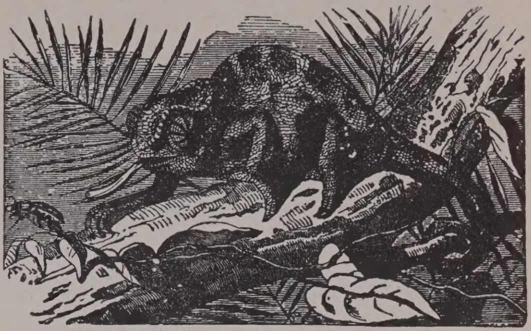
JOSEPH CHAMBERLAIN

Chambers (*chām′bẽrz*), **William,** was born on April 16, 1800, at Peebles, Scotland. The boy's schooling ceased in his thirteenth year, owing to his father's business troubles. After a five years' apprenticeship to an Edinburgh bookseller, he started in business t himself, soon adding printing to bookselling. In 1832 he founded *Chambers' Edinburgh Journal*, the pioneer of a class of cheap and popular periodicals of a wholesome kind, now so general. Together with his brother Robert, he wrote and published many useful books, especially the *Cyclopædia of English Literature* and *Chambers' Encyclopædia* in ten volumes. He died on May 20, 1883.

Cham′bersburg, Pa., a borough, the seat of Franklin County, on Conococheague Creek and on the Western Maryland, and the Cumberland Valley railroads, about 50 miles southwest of Harrisburg and 150 west of Philadelphia. It is an attractive town, with many fine buildings, including churches and schools, besides Wilson (Presb.) College for women; and in the neighborhood are Mont Alto, Wolf Lake and Pen-Mar Parks. The city owns and operates its electric-light plant and waterworks, and in addition to the Cumberland Valley Railway car and machine-shops, has manufactures of paper, iron, engines, boilers and milling machinery; also establishments for the manufacture of shoes, furniture, gloves, hosiery, woolen goods and flour. Population 13,500.

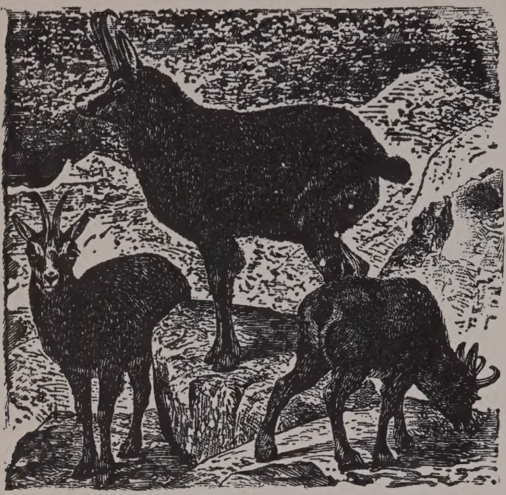
Chambord (*shän′bôr′*), **Henri Charles, Comte de,** and Duc de Bordeaux, claimant to the French throne as the last representative of the elder branch of the French Bourbon dynasty, was born at Paris, Sept. 29, 1820, and died near Vienna, Aug. 24, 1883. He was the son of the Duc de Berri, and in 1836 married the Princess of Modena, but left no children In 1830 his grandfather, Charles X, abdicated in the Count of Chambord's favor, when he assumed the title of Henri V; but his claim was unrecognized by France, and Louis Philippe came to the throne, while the Count had to go into exile.

Chameleon, a lizard of Africa and Madagascar, with the power of changing its color to correspond with that of surrounding objects. The name properly belongs to the Old World form, though it is now commonly applied to certain small lizards of the southern United States, which have the same power of quickly changing color, though this is not confined to the chameleons. Nearly all lizards have it to a greater or less degree, but it is highly perfected in the chameleon. Even a passing cloud is said to affect the particular shade of its color. The true chameleon of Africa is covered with granular scales and has a rigid head but very movable eyes. The long tongue is worm-like, with a knob on the end, and is run out with remarkable quickness to catch insects. The tail is clinging. It is also capable of puffing out the neck with air. The American chameleon belongs to a different family. It is a smaller animal, covered with minute scales, and very abundant in the southern United States and the island of Jamaica. Its body is about three to three and one half inches long, and the tail alone is about six inches. It is white below, but above can change rapidly to shades from emerald green to dark bronze. It assumes most perfectly the green color, and, on the leaves of palmettoes, can scarcely be seen if looked at from above, but, by looking from underneath, the dark shadow of the animal shows its position. It sleeps during the night and is most active in the daytime, when insects are moving. The cat is its natural enemy, and will leave all other kinds of food, even fish, for the chameleon. Various explanations have been suggested to account for its ability to change color. The outermost layer of skin is transparent, and underneath are two colored layers—the upper layer lighter and the deeper one darker. Both of these can be changed in intensity by contraction or expansion of the coloring substance. This is probably effected through the nervous system.



CHAMELEON

Chamois, (*shăm′mȳ* or *shȧ-moi′*), a small mountain antelope inhabiting the European Alps from the Pyrenees to the Caucasus. It is about 3 feet long and 2½ feet high at the shoulders. It may be known by the horns, which are carried by both sexes. They are from six to eight inches long, black, slender and round; they rise almost vertically from the forehead, and at the extremities suddenly hook backward and downward. The body is covered with coarse reddish-brown hair, paler on the head, with a dark-brown streak on each side. The hair becomes lighter in the spring. Underneath the hair is a short, thick, grayish wool. The tail is short and black. They are shy and live in herds, always posting a sentinel when feeding. The signal of danger is a whistling sound, accompanied by stamping of the fore feet. Chamois-hunting in Switzerland used to be a favorite but dangerous amusement. The hunter followed the animals into almost inaccessible places and sometimes bared the feet and scratched them enough to cause slight bleeding, in order to prevent slipping on the smooth rocks. Chamois were once common in the Swiss Alps, but are now greatly reduced in numbers. In the Austrian mountains, where they have been better preserved, it is not uncommon to see bands of 20 or 30 individuals. The agility and climbing powers of the chamois are famous; its foot is especially well formed for laying hold of slight projections on the rocks. The outer margin of the solid hoof is lower than the sole, forming a shallow depression. In summer chamois ascend to the limits of the snow-line; in winter they descend to the wooded districts that border the glaciers. They do not hesitate to spring over chasms nor to leap downward 20 or 30 feet against the rocky face of an apparently perpendicular precipice. The fine soft leather known as *Shammy* was originally made from chamois-skin, though many of the skins now sold under that name are manufactured from sheep-skin. The flesh is prized as food, and resembles venison in flavor.


CHAMOIS

Chamouni (*shȧ'mō'nē'*), a celebrated valley among the French Alps, is about 3,400 feet above the level of the sea. It is about 13 miles long and two broad. On the south is the giant group of Mont Blanc, from which great glaciers glide down, even in summer, almost to the bottom of the valley. The chief of these is the *Glacier des Bois*, which in its upper course expands into a large mountain lake of ice, called the *Mer de Glace*. Over 15,000 tourists visit the valley every year, and from this point Mont Blanc is usually ascended. The beauties of Chamouni have been written of by Byron, Coleridge, Shelley, Wordsworth, Lamartine and Ruskin.

Champagne an ancient province of the kingdom of France. It was bounded on the north by Liége and Luxemburg, on the east by Lorraine, south by Burgundy, west by Picardy and Isle de France. In modern republican France it was divided into the departments of Ardennes, Marne, Aube, and Haute Marne, with also parts of the Aisne, Seine-et; Marne, Yonne and Meuse. The name (in Latin "campania", country of plains) is derived from the immense plains near Reims, Troyes and Chalons.

Champagne first became a recognized political unit about the year 1020, when Eudes (Odo) II, count of Blois, was created count of Champagne. He fought against the emperor Conrad, and died in battle in 1037. It is unnecessary to trace the troubled history of the descendants of this count, except to note that one of them in 1314 became king of France as Louis X, and thereby attached the province to the French crown.

During the Middle Ages the celebrated fairs of Champagne were attended by merchants from every part of Europe. There were six of these fairs (two of them at Troyes), which formed a sort of continuous market, divided into six periods; they formed, in fact, a perpetual fair, offering to different parts of the country in turn the means of selling their produce, and of procuring foreign articles in exchange. The fairs were benefited by special legislation, and special magistrates, called "masters of the fairs", controlled the police. The most famous product of the region is the sparkling wine to which it gives the name.

Champaign (*shăm-pān'*), a city in Champaign County, Ill., 128 miles south of Chicago. It has the service of the Illinois Central, the "Big Four" and several other railroads. It is situated in a rich agricultural region, and has foundries, machine-shops and a number of manufacturing interests. Located here is the Burnham Athenæum and Hospital. The cities of Urbana and Champaign join, and they have electric service. The University of Illinois is located between Champaign and Urbana. Population, 15,823.

Champ-de-Mars (*shon'de-märz'*), a large square on the outskirts of Paris, where military reviews are held. The first great feast of the Revolution was held here on July 14, 1790. At that time the place was not ready, and all Paris, men and women, turned out and worked night and day to put it in readiness. It has been used for fairs, feasts, great mass meetings and demonstrations of mobs.

Champlain (*shăm-plān'*), a beautiful lake separating the states of New York and Vermont. It is 110 miles long and from one to 15 broad. It empties into the St. Lawrence through the Richelieu River, and a canal joins it to the Hudson. Here the Americans defeated the British in a naval battle in 1814. The lake is named from its discoverer, Samuel de Champlain.

Champlain, Samuel de (1567-1635). Of the most striking figure, perhaps, in Canadian history during the French régime, Sir John Bourinot says: "It was not in Acadia but in the valley of the St. Lawrence that France made her great effort to establish her dominions in North America. Samuel Champlain, the most famous man in the history of French Canada, laid the foundation of the present City of Quebec in the month of June, 1608, or three years after the removal of the little Acadian colony from St. Croix Island to the Basin of the Annapolis. For 27 years Champlain struggled against accumulating difficulties to establish a colony on the St. Lawrence. He won the confidence of the Algonquin and Huron tribes of Canada who then lived on the St. Lawrence and Ottawa Rivers and in the vicinity of Georgian Bay. He recognized the necessity of an alliance with the Canadian Indians who controlled all the principal avenues to the great fur-bearing regions . . . It was during Champlain's administration of affairs that the Company of the Hundred Associates was formed under the auspices of Cardinal Richelieu, with the express object of colonizing Canada and developing the fur-trade and other commercial enterprises on as large a scale as possible. The company had ill-fortune at the outset . . . When Champlain died on Christmas Day, 1635, the French population of Canada did not exceed 150 souls, all dependent on the fur-trade. Canada so far showed none of the elements of prosperity; it was not a colony of settlers but of fur-traders. Still, Champlain by his indomitable will, gave to France a footing in America which she was to retain for a century and a quarter after his death. He stands foremost amongst the pioneers of European civilization in America."

Dr. Dawson, in his volume on the St. Lawrence Basin, gives the following interesting sketch of Champlain: "Champlain was a many-sided man, strong in body as in mind. He was as much at home in the brilliant court of France as in a wigwam on a Canadian lake, as patient and politic with a wild band of savages on Lake Huron as with a crowd of grasping traders in St. Malo or Dieppe. Always calm, always unselfish, always depending on God, in whom he believed and trusted, and thinking of France which he loved, this simple-hearted man resolutely followed the path of his duty under all circumstances; never looking for ease or asking for profit, loved by the wild people of the forest, respected by the courtiers of the king and trusted by the close-fisted merchants of the maritime cities of France."

Champs-Elysees (*shon'zä-lē-zä'*) (meaning elysian fields), celebrated gardens and an avenue-promenade in Paris, between the Place de la Concorde and the Arc de Triomphe. It came into the possession of the city in 1828, and is extensively used as a public resort.

Chan'cellorsville, a village in Virginia, south of the Rappahannock River, where a series of battles were fought May 2-4, 1863, between the Army of the Potomac under General Hooker and the Confederate army under General Lee. The Union army, though superior in numbers, after three days' terrible fighting was defeated and retreated across the Rappahannock, with a loss of 18,000 men. The Confederate loss was 13,000, including the brave and able Stonewall Jackson, who was accidentally shot by his own men and died eight days later.

Chandler, Zachariah, United States senator from Michigan (1857-75 and again in 1879) and secretary of the interior (1875-77), was born at Bedford, N. H., Dec. 10, 1813, and died suddenly at Chicago, Ill., Nov. 1, 1879. He was for a time in the dry-goods business in Detroit, Michigan, where as an active anti-slavery Whig, he took interest in the "underground railroad," by which slaves found their way to freedom in Canada. In 1857 he was elected to the United States senate, and continued a member of that body till his death, with the intermission of the years 1875 to 1879. In 1875 he was secretary of the interior in the Grant administration. During the Civil War he was loyal to the Union, and rigidly defended it against the slave-states. He also opposed, for the time, the admission of Kansas.

Chang-Choo-Fou, a large city of China, in the province of Fokien, 35 miles from Amoy, its port on the coast, It is well built, and has a large Buddhist temple. Population, estimated at 1,000,000.

Channel, The English, is the narrow sea between England and France. It joins the North Sea at the Strait of Dover, where it is only 21 miles wide. From here to its junction with the Atlantic, where it is 100 miles wide, its length is 280 miles It contains the Channel Islands, the Isle of Wight and others.

Channel Islands, a group of small islands off the coast of France, subject to Great Britain. Jersey, Alderney, Sark and Guernsey are the largest. The whole group covers 75 square miles, with a population of 95,618. The islands contain much fine scenery. They belonged to Normandy when William the Conqueror invaded England, and have belonged to England ever since. The people still speak Norman-French; while modern French is the official language used in courts and the legislature. Politically, the islands are administered by their own laws and customs, each by a lieutenant-governor with judicial and other functionaries, and a states' assembly, partly elective. Jersey has a separate legal existence. Guernsey, Alderney and Sark have a lieutenant-governor in common, but otherwise their governments are separate. In these respects, the islands may well be called the Land of Home-Rule. The islanders are mainly farmers, and fertilize their lands with the rich seaweed gathered on the coasts. The fine breeds of Alderney and Jersey cattle come from here.

Chan′ning, William Ellery, a great American preacher and writer, was born on April 7, 1780, at Newport, Rhode Island. He graduated from Harvard in 1798, and preached first as pastor of a Congregational church in Boston. Here his sermons soon became famous for their fervor, solemnity and beauty. He gradually drifted toward the Unitarian creed. His interest was not confined to religion alone, for he advocated temperance and education and was opposed to war and slavery. He stands high also as an essayist. Among his most popular essays are those on *National Literature*, *John Milton*, *Fénelon* and *Self-Culture*. He died at Bennington, Vermont, Oct. 2, 1842.

Chantilly (*shän-tē-yē′*), a town in France, in the department of the Oise, 25 miles north-northeast of Paris, noted for its fine lace-manufactures. The famous races of the French Jockey Club are held here. Here was the magnificent palace of the great Condé, which was destroyed during the Revolution. The Duc d'Aumale, in 1850, built a fine castle here, which, with its domains about it, he presented in 1887 to the French Institute. Population, 4,500.

Chapleau, Hon. Joseph Adolphe, was born in Terrebonne (Quebec), in 1840. He was called to the bar in 1861, and was created an officer of the Legion of Honor (France) in 1882. A professor, in Laval University, of Criminal Jurisprudence. He was solicitor-general under Mr. Ouimet in 1873, was appointed provincial secretary, 1876, and in 1879 was premier of Quebec. Appointed Secretary of State in Canada in 1882. He was elected to the parliament of Canada in 1867, 1871 and 1875, and was elected for Terrebonne in the House of Commons in 1882. He was a very prominent and influential French Canadian for at least a quarter of a century. His death occurred in 1889.

Chapultepec (*chȧ-pōōl′tā-pĕk′*), a Mexican fortress, built on a rock 150 feet high, about two miles from the city of Mexico. On Sept. 8, 1847, General Scott first stormed Molino del Rey, an old powder-mill in rear of the fortress and then, September 12, brought four batteries to bear on Chapultepec from the opposite ridge. After cannonading a day and a half, attacks on the two sides were made at the same time, which carried the castle, with slight loss to the Americans. This victory threw open the causeway leading to the city, and, the day after, United States troops occupied the Mexican capital. To-day Chapultepec is occupied as the summer residence of the president of Mexico, General Diaz; it is the seat also of an observatory and a military school.

Characeæ (*kȧ-rā′sē-ē*). A group of aquatic plants, commonly called stoneworts and usually included among the green algæ (*chlorophyceæ*). They have no other coloring matter than chlorophyll, but they are so different from the other green algæ that it is doubtful whether they should be included with them. They are more complex than the other algæ, growing in fresh or brackish waters and being fixed to the bottom. They often form great masses, even choking up shallow ponds. They are coarse, thready and branching growths, whose walls become incrusted with a deposit of lime, which makes them harsh and brittle and suggests the common name, stoneworts.

Char′coal. Animal charcoal is made from bones by heating in a closed vessel or retort, when the gases, water-vapor and oil are given off, and bone-black, mainly carbon, remains. It is seen usually in coarse grains, from the size of peas to pin-heads, and is used mostly in removing colors from liquids. Syrup of sugar, for example, is allowed to drip through a layer of bone-black; all color is held by the charcoal and the syrup runs through clear and colorless. This is due to the charcoal's earthy matter and also to its being porous. Bone-black is also used to absorb disagreeable smells. Wood-charcoal is one of the most important varieties of carbon. Wood consists of carbon, hydrogen and oxygen. When heated in the open air, it burns away, except a small white ash; but if the air is partially cut off, only the gaseous matters escape, leaving the carbon. Billets of wood are stood on end in rows, making a large cone-like heap, which is covered with turf or moistened charcoal ashes, and holes left at the bottom for air to get in. An open space for a chimney is also left at the top, and the wood burns slowly from top to bottom and from center to outside. When fully burned, the heap is covered and left to cool two or three days. One hundred parts of wood average 24 parts by weight of charcoal. Charcoal is black and brittle, and keeps its wood-form. It is never pure carbon, usually from 65 to 96 per cent. Charcoal is largely used as a fuel, in some countries taking the place of coal. Its use in the reduction of iron-ore is important. Fence posts, telegraph poles and piles driven in mud or beds of rivers for foundations are often charred on the outside to preserve them from decay. It is also used in water filters, for tooth powder and as a medicine.

Chares of Lindus, the Rhodian sculptor. See Colossus of Rhodes.

Charity, Sisters of, an organization usually consisting of nuns or celibate women, founded by St. Vincent de Paul near Paris about the year 1633. The object of the sisterhood was to take care of the poor, especially the sick, and to educate children. Prisons, free schools, hospitals and almshouses were at once placed under their care.

The archbishop of Paris gave them the name of Servants of the Poor, which they have proudly kept ever since. The sisters became so useful and beloved that they were spared by the Revolution. They have since spread to almost every civilized country, and are doing a good and faithful work.

Charlemagne (*shär'lē-män*), meaning Charles the Great, born April 2, 742, was the eldest son of Pepin, the first king of the Franks, of the Carlovingian dynasty. He was at first joint-king with his brother Carloman, but on the latter's death in 771 he became sole king. Six wars made him master of the Saxons, whom he Christianized. Crossing the Alps with two armies, he overthrew the kingdom of the Lombards in 774. In 778 he invaded Spain, and by his campaign against the Moors added a large region south of the Pyrenees to his kingdom. Ten years later Bavaria was made a part of his empire, and the savage Avars were conquered. In 800 he fought as the ally of the pope against the rebellious Romans. Here, while worshiping in St. Peter's church on Christmas Day, the pope set a crown upon his head and, amid the shouts of the people, saluted him as the emperor of the Romans. The remainder of his reign was spent in strengthening his vast empire, which extended from the Ebro to the Elbe. Bishoprics were founded; the country was divided into districts ruled by counts; and counts, called markgrafen, defended the frontiers from attack. A further element of strength was a great yearly military muster, attended by the high officials of the empire. Charlemagne was not merely a soldier; a learned man for his era, he had a school in the palace for the sons of his servants and set up schools throughout the country. He promoted commerce and manufactures; he also took an interest in farming, and had fruit trees brought from southern Europe and planted by his subjects on their lands. His fame spread to all parts of the world, the great Caliph Haroun-al-Raschid sending an embassy to show his respect. Charlemagne was tall and looked every inch a nobleman. The greatness of his kingdom ended with his own life. His successors were weaklings, and the great empire fell to pieces. Yet his attempt to maintain order and observance of law among his people and to gather small tribes into one great nation, had great effect in making Europe civilized. He died Jan. 28, 814.

Charles I, king of England, born Nov. 19, 1600, was a weakly child, unable to speak until his fifth year or to walk until his seventh. He, however, outgrew both defects, became active in outdoor sports and was an accomplished scholar. He succeeded his father in 1625, and the same year welcomed, at Dover, his little bright-eyed queen. the French Princess Henrietta Maria, whom he had married by proxy six weeks earlier. At first he was the mere tool of Buckingham, but after that noble's murder in 1628, he gradually submitted himself to the guidance of his wife. It was his yielding to her influence and also to that of Stafford and Laud, that caused the rupture between the king and Parliament. The struggle was caused by Charles' determination to get money without rendering an account of it. For eleven years he ruled without summoning a parliament. His attempt to make the inland counties pay a ship-tax was met by the resistance of Hampden; while Laud's foolish attempt to force the Scottish church to become English arrayed the whole northern kingdom against him. In 1640 two parliaments met; the short parliament, which lasted but three weeks, and the long parliament, which outlasted Charles. Afraid that the queen would be impeached, he signed the bill which sent Stafford to the block. Then came Pym's Grand Remonstrance, as it was called, and Charles' attempt to arrest the five members of Parliament who had gone farthest in opposing him. In 1642 began the Civil War, in which Charles showed great bravery but which resulted at the battle of Naseby, in the utter destruction of his cause. He was tried and condemned to death, and on the 30th of January, 1649, was beheaded. His faults were as a ruler. As a man, a husband and a father, one English prince alone is worthy of being named beside him—the late prince consort. It has been well said: "No man so good was ever so bad a king."

Charles II, king of England, born May 29, 1630, was present with his father at the battle of Edgehill, when but 12 years old, and in 1646 he escaped to France. In 1650 he landed in Scotland, was crowned at Scone, and with 10,000 Scots marched into England, but was defeated and his army put to rout by Cromwell at Worcester. For six years Charles wandered about, a fugitive with a price of £1.000 set on his head now hiding in an oak tree and anon disguised as a serving-man. More than 40 persons shared in his secret, yet not one betrayed him, and he escaped from the country. On the fall of the protectorate in 1660 he was recalled to the throne. His first adviser was Lord Clarendon, who was succeeded by the cabal or cabinet, and they by Shaftesbury. He was unpatriotic, selling to France Dunkirk, a French town which the English had long held, and also secretly taking money from Louis XIV for not opposing the schemes of France. Two wars with Holland; religious troubles at home; the struggle to prevent the king's brother James, duke of York, from being declared heir to the throne; and the Popish and Rye House plots made up the political incidents of his reign. Under Charles II happened the great plague, when nearly 70,000 Londoners died, and the great fire which burned 13,200 houses. His reign has been called the worst in English history; a friend said that "he never said a foolish thing, nor ever did a wise one"; yet he was interested in science, was always popular and was nicknamed the Merry Monarch. Charles died Feb. 6, 1685.

Charles VII, king of France, born Feb. 22, 1403, succeeded his father, Charles VI, in 1422, when all northern France was held by the English, who proclaimed Henry VI, of England king of France. The English, after some successes, laid siege to Orleans, the capture of which would wholly cut off the French from the north. At this time the famous Joan of Arc, the Maid of Orleans, by her wonderful courage and belief that she was sent by Heaven to deliver her country roused the courage of nobles and people. The siege was raised, the English retreated, and soon lost all they had gained in France. In 1437 Charles entered Paris and spent the remainder of his reign in restoring order and prosperity to France, after the great misfortunes the country had suffered. He died July 22, 1461.

Charles IX, king of France, the second son of Henry II and Catherine dei Medici, was born in 1550 and succeeded his brother, Francis II, in 1560. He was weak and wavering, and led in all things by his mother. It was her counsel that drove him to authorize the massacre of St. Bartholomew's Day. He died May 30, 1574.

Charles X, king of France, the grandson of Louis XV, was born at Versailles, Oct. 9, 1757. He received the title Comte d' Artois, and in 1773 married Maria Theresa of Savoy. After the fall of the Bastille, in 1789, he headed the first emigration of nobles and took the lead in the attempts made to restore the monarchy. Under Louis XVIII Artois headed the royalist party, and by the death of that monarch became king under the title of Charles X. At first he was popular with all parties, but it was soon plain that he wished to make his rule as absolute as that of the old French monarchy. The people became discontented, and a struggle ensued with the chamber of deputies. On July 26, 1830, the king signed the five well-known ordinances, putting an end to the freedom of the press, making a new mode of election and dissolving the chamber that had just been elected. Paris at once took up arms. In three days the revolution was finished, Charles was driven from the capital, and Louis Philippe declared king. Charles lived the remainder of his life in exile. He died Nov. 6, 1836.

Charles V, emperor of Germany, was born at Ghent in 1500. From his father he inherited the Low Countries and from his mother Spain and Naples, together with the Spanish colonies in America. In 1516 he became joint-ruler of Spain with his mother Juana, and in 1519 he was made emperor of Germany. The history of western Europe for the next quarter of a century is largely made up of the rivalry of Charles and Francis I of France. The other powers, Henry VIII of England and the different popes favored first one and then the other, which resulted in war between the monarchs during much of the era. Most of the fighting was done in Italy, where the possession of Milan was in dispute. First, Charles V drove the French out of Italy and besieged Marseilles. The next year Francis, in trying to recover Milan, was taken prisoner at the battle of Pavia and had to buy his freedom by giving up all he had been fighting for. Charles was now so successful that the Holy League, with the pope at its head, was formed against him. An army under Constable Bourbon sacked Rome and imprisoned the pope, Charles claiming to have nothing to do with it; but it left him master of Italy. But now trouble called him home to Spain. An insurrection had arisen, which he put down, and at the same time by his tact made himself popular throughout the country. In Germany he found himself opposed by the Protestants, who had formed in defense the League of Smalkald. Threatened by an invasion of the Turks, he was forced to agree to many of their demands. In 1535 he accomplished the most brilliant of all his exploits, the destruction of the power of the great corsair, Barbarossa, and the capture of Tunis. A later expedition to put down the Algerian pirates was badly wrecked, and Charles himself had great trouble in reaching the coast of Spain. By two more wars with France, when Francis went so far as to call on the Turks to help him, he triumphed over the French king. Two things he now wished to effect, but in both of which he failed, were to suppress the Protestant party in Germany and have his son Philip accepted as heir to the empire, and not merely to the throne of Spain. The young and brilliant Maurice of Saxony, by suddenly opposing Charles with a secretly gathered army when his own was scattered, obtained from him lawful recognition for the Protestants. The German princes declared in favor of Philip's brother Ferdinand as their next emperor. Baffled by his unruly German subjects, seeing no way to keep his empire from being divided at his death, the disappointed emperor resigned his throne in 1555. The three remaining years of his life (he died Sept. 21, 1558) were spent in retirement in a Spanish monastery. Charles was in person slight, graceful in manner and popular with all classes of his subjects among the various peoples under his sway.

Charles XII, king of Sweden, was born June 27, 1682, the son of Charles XI. Ascending the throne when 15 years old, his boyishness tempted Denmark, Poland and Peter the Great of Russia to attack Sweden, at that time the great power of the north. Charles at once besieged Copenhagen and forced a peace. Next, with 8,000 Swedes, he attacked the camp of the Russians, 50,000 strong, and in the battle of Narva routed them with great slaughter. The king of Poland was now driven into the heart of Saxony, conquered and dethroned. In 1700 Charles invaded Russia with an army of 43,000, almost captured the czar and won several battles. But here, trusting to the promises of the Cossack, Mazeppa, the Swede turned southward to meet him. Mazeppa and his troop failed to come up. His reënforcements cut off, he was forced to winter in a hostile and barren country, losing half his army; and though in the spring he marched at once on Peter, he was defeated. With a handful of attendants he fled across the Turkish border, but instead of gaining the sultan as an ally, Russian spies spread such reports about him that he was arrested and imprisoned. In 1714 he escaped and made his way through Germany and Hungary in 16 days. But his love of fighting was only intensified by his misfortunes, and a project now entered his head that promised fighting enough. This was to make peace with Peter, conquer Norway, next land in Scotland and replace the house of Stuart on the English throne. When at peace with the czar, he burst into Norway, and early in 1718, while urging on siege-works in the dead of winter, he was killed by a musket-ball from the fortress. Charles was almost foolishly brave; his dress was simple, and he shared the coarsest food and the hardest labor with the common soldiers with a cheerfulness that won their devotion.

Charles XIV of Sweden. See BERNADOTTE.

Charles the Bold (Duke of Burgundy), son of Philip the Good of Burgundy, was born Nov. 10, 1433. He succeeded his father as duke in 1467. He was the lifelong enemy of Louis XI of France. Joining with other great nobles in fighting for what they considered their rights as against the crown, their army threatened Paris and defeated the king. The province of Burgundy had once been a kingdom, and Charles now planned to restore it by conquering Lorraine, Switzerland and Provence. In this, however, he was not successful, being twice defeated by the Swiss. Finally, in a battle against the Duke of Lorraine, fighting with his usual courage and boldness, he was killed, Jan. 5, 1477. Richer and more powerful than any prince of his time, of great size and strength, his great ambition and reckless boldness combined to make him the most striking figure of the period.

Charles Edward (the Young Pretender), the son of James Stuart, the first Pretender, was born at Rome, Dec. 31, 1720. Unlike his father and grandfather, he was talented and firm of purpose. As a boy he served in the Spanish army against Austria. On the breaking out of war between France and England in 1744, the French furnished him with a powerful fleet and an army under the command of Marshal Saxe, the greatest soldier of the time, with which to secure the throne of the Stuarts, but the expedition was driven back by storms. The French refusing to let him try again, he managed to collect enough funds to fit out two small vessels. One was driven off by a British cruiser, but the second bore Charles to Scotland, where an army of Highlanders slowly gathered about him. He destroyed an English army sent against him at Prestonpans, which gave him such a reputation that he marched to within 100 miles of London, which he could have captured, but the Highlanders forced him to retreat. After winning the battle of Falkirk, his Highland chiefs forced him again to retreat to the Highlands, where the disastrous defeat of Culloden ruined his cause. He might have won this battle, too, had not the MacDonald clan refused to charge, sulking because they had been moved from their traditional position on the right wing. After months of wandering, the Pretender escaped from the country. He lived in Europe as the Count of Albany, until his death at Rome in 1768.

Charles I, Emperor of Austria, born Aug. 17, 1887, succeeded Francis Joseph on the throne Nov. 21, 1916, in the second year of the European War. With the downfall of the monarchy at the end of the war and the establishment of a republic he fled and took refuge in Switzerland.

Charles, Law of. When a constant mass of gas is heated, either or both of two things may happen to it. (1) The effect may be to increase the volume of the gas while the pressure remains the same; (2) the effect may be to increase the pressure of the gas while the volume remains constant; or (3) both the volume and the pressure may be changed simultaneously. Charles' law, which might more properly be called Gay-Lussac's law, tells us just how these changes take place. If the mass and pressure of the gas remain constant, then the volume of the gas increases $\frac{1}{273}$ part for each degree centigrade through which it is heated. Thus, if we denote by V_0 the volume of the gas at the temperature of melting ice, its volume at any other temperature, V_t, will be given by the following equation:

$$\begin{aligned} V_t &= V_0[1 + 0.003665\, t^\circ] \\ &= V_0[1 + \tfrac{t}{273}] \end{aligned}$$

The fact thus described is known as Charles' law. If the volume remains constant and the pressure changes, the effect is described by the following equation:

$$P_t = P_0[1 + 0.003665\ t^\circ]$$

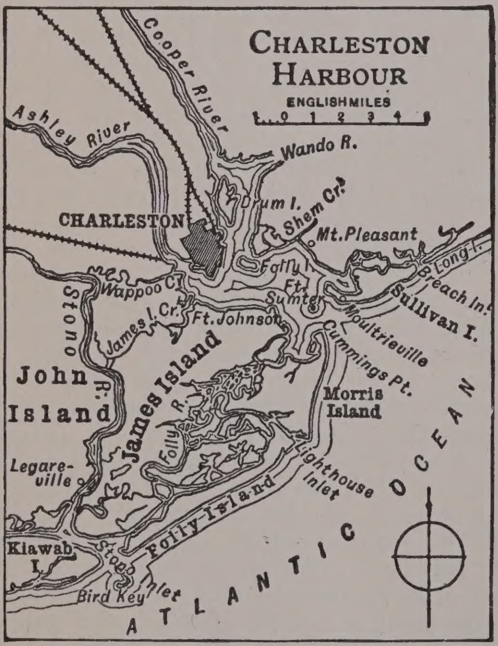
where P_0 is the pressure at the temperature of melting ice and P_t the pressure at t°. If pressure and volume both change, then

$$P_t V_t = P_0 V_0[1 + 0.003665\ t^\circ]$$

The student should be warned that this law of Charles is very accurately true for all gases throughout a moderate range of pressures, but is not exactly true for any gas, and does not hold at all in the case of vapors.

Charles Martel, meaning CHARLES THE HAMMER, was born about 688. He was mayor of the palace under the last Frankish kings of the Merovingian dynasty, and was the real ruler of the Franks. He carried on wars with the Saxons, the Alamanni and the Bavarians; but his great service to Europe was his driving back of the Saracens. They had already taken Bordeaux and had advanced to the Loire, when Charles met them in 732, and after a hard-fought battle wholly defeated them. This was one of the most important victories in the world's history, and probably kept Europe from becoming a Mohammedan country and being to-day no further advanced than Arabia. Charles died in 741.

Charleston, the chief port of South Carolina, was founded in 1670 as an English colony. It was captured by the British in 1780. The first ordinance of secession was passed here, and the reduction of Fort Sumter in its harbor was the first conflict of the Civil War. In 1861 nearly half of the city was burned to the ground, and it was in a state of siege during the last two years of the war. Then again, in 1886, a heavy earthquake visited the city and wrought $8,000,000 of damage.



Charleston is situated on a peninsula, formed by the Ashley and Cooper Rivers, while a third river, the Wando, unites with the Cooper at the city. The estuary formed by these rivers makes a magnificent harbor. It is even regarded as the safest on the Atlantic coast.

Fort Moultrie, at Sullivan's Island on the eastern side of the harbor, is one of the best equipped defenses on the coast. It and the naval station at Charleston, which occupies a tract on Cooper River, have cost the government several millions.

Charleston's commerce was almost destroyed by the Civil War, but much of that which entered other channels has been recovered, and the terminal docks for two ocean-freight lines which were established in Charleston in 1901 have also increased the city's commercial prestige. Eleven manufactories are engaged in producing phosphate fertilizers, which is the leading industry; others of importance are tobacco, foundry and machine-shop products, oil and rice milling, bagging-factories, turpentine-casks and baskets for shipping vegetables and fruits.

Charleston has good public and parish school systems, and for higher education, the Charleston and Meninger High School, Academy of Our Lady of Mercy, Smith's school for young ladies, the South Carolina Military Academy, a state institution established in 1843, the state Medical College and many others.

Charleston's fame as a cultural center is well known, and its Magnolia and Middleton Place Gardens are world-renowned. The city has many new, beautiful buildings, and its port is developing fast. Population, 75,000.

Charleston, capital of West Virginia and county seat of Kanawha County, is situated on the Kanawha River at its junction with the Elk. The Kanawha has an excellent system of locks and dams, which afford facilities for shipping coal from the rich New River mines. Charleston is the center of trade for large coal and lumber interests. Its industries include woolen-mills, machine-shops, boiler-works, iron-foundries, steel-plants, dye-works, marble-works, wagon-shops, glass-works, furniture-factories and one of the largest axe-factories in the world. It has many fine public buildings, among which are the Capitol and Capitol Annex, Court-House Y. M. C. A. building, modern and well-equipped houses and handsome churches Population, 50,000

Charlestown, Mass. Charlestown is situated at the mouth of the Charles River, opposite the old city of Boston. In 1873 it was annexed to the city of Boston. At that time it had a population of 28,000. It is the scene of the first real battle of the Revolution, that of Bunker Hill.

Charlotte, N. C., a growing city and railroad center, the capital of Mecklenburg County, situated on Sugar Creek, 110 miles north of Columbia, capital of South Carolina. Its balmy climate and high average temperature are favorable for invalids. Gold has been found in the vicinity, and there is here a branch of the United States mint. It is the seat of Queen's College for girls. It has numerous manufactories and a good trade in cotton-goods, tobacco, iron-castings, and agricultural implements. Population, 50,000.

Charlot′tenburg is a large suburb lying to the west of Berlin. It was visited by tourists for the sake of the royal palace, built here in 1696 by Frederick I for his second wife, Sophia. The grounds and statuary are of great beauty. Charlottenburg has become the seat of many factories; and its population, which in 1871 was estimated at less than 20,000, has multiplied no less than tenfold.

Char′lottesville, Va., a city, the seat of Albemarle County, on the Rivanna River and on the Southern and the Chesapeake & Ohio railroads, about 100 miles northwest of Richmond. It is the seat of the University of Virginia, founded in 1819 by Thomas Jefferson of Monticello, near by; also the seat of Albemarle College, Rawlings Female Institute and other educational institutions. Settled in 1744, Charlottesville became a city in 1888. It became a city of the first class in 1916, by the annexation of adjacent territory. Its industries embrace cigar-factories, flour mills, planing mills and woolen mills and textile manufactures. The population at the present time is 12,000.

Char′lottetown, the capital of Prince Edward Island (which is separated from New Brunswick and Nova Scotia by Northumberland Strait) has a population of 13 000. It is nicely located on a good harbor in Hillsborough Bay. It has the main trade of the island. Its main industry is shipbuilding. The Prince Edward Island Railway, owned by the government of Canada, connects Charlottetown with the towns of the island, and a submarine telegraph connects the island with the province of New Brunswick, a distance of nine miles.

Charter-House, a famous school and hospital of London, founded in 1611. It first provides a good home for 80 "poor brethren." The Charter-House school maintains some 60 scholarships, worth from $375 to $475, which are open to boys from 12 to 15 years old. Besides the holders of these scholarships, many Londoners send their boys to this school because of its reputation. Blackstone, Addison, Steele, John Wesley, Grote. Thackeray, John Leech, Eastlake and many other men of note and ability were educated there. In 1872 the school was removed to Godalming in Surrey.

Charter-Oak. See ANDROS and HARTFORD.

Chase, Salmon P., chief-justice of the United States, was born at Cornish, N. H., Jan. 13, 1808. He graduated at Dartmouth College, and entered the law, practicing at Washington, D. C. His edition of the *Statutes of Ohio*, now court authority, made him known as a jurist, while his arguments in several cases intrusted to him, in favor of the rights of fugitive slaves, brought him into great prominence. In 1841 Chase entered politics as an opponent of slavery extension and was one of the founders of the Free-soil party. In 1849 he was chosen senator from Ohio as a Democrat, but withdrew from that party soon after on the slavery question. On his record in the senate he was elected governor of Ohio by the Republican party in 1855, and re-elected two years later. He was secretary of the treasury in President Lincoln's cabinet from 1861 to 1864. On him fell the burden of finding the ways and means of carrying the government financially through the war. Legal-tender greenbacks, issuing of bonds and the national banking system were the chief means used. In 1864 he became chief-justice of the United States, and as the head of the supreme court presided at the impeachment trial of President Johnson. He died at New York on May 7, 1873.

Chateaubriand (*shȧ-tō′brē′än′*), **François René, Vicomte de,** a French man-of-letters, was born in Brittany, Sept. 14, 1768. At the time of the French Revolution he took part at first with the exiled royalists, but, returning to France, was employed in a diplomatic service by Napoleon. On the murder of the Duc d'Enghein, he threw up his office as ambassador to the Republic of Valais. He supported the restoration monarchy, becoming a minister of state, and was appointed ambassador-extraordinary to England. He visited America when a young man, and afterwards traveled in the east. His love story of savage life, *Atala*, made his literary reputation. This appeared in 1801, and the *Genius of Christianity* added its quota to raise him to the foremost place among French writers of the day. Chateaubriand's books abound in passages of brilliant description, and there is no French author before him whose prose writings can compare with his in the power of conveying the beauty and mystery of nature. Chateaubriand is called the father of the French romantic school of writers. He died at Paris, July 4, 1848.

Chateauguay (*shȧ′tō′gǡ′*), a village in the county of that name in the province of Quebec, possessing a monument erected in 1895 to commemorate the victory there gained by Col. de Salaberry over the Americans in 1813.

Chatham, Earl of. See PITT.

Chatham (*chăt′ăm*), Northumberland County, N. B., is the chief town on the gulf coast of the province, lying on Miramichi Bay, with a fine harbor and much activity in shipyards, mills, foundries and lumber. It has a population of about 5,000. To the southwest, along the Miramichi River, are the best salmon grounds in Canada.

Chat′ham, a city of 10,317 in western Ontario. Situated on the River Thames. Considerable manufacturing is done here. A carriage-manufactory is one of its largest industries. It is in the natural-gas and oil district. The district surrounding it is particularly rich and fertile. It is growing rapidly, its natural advantages proving attractive.

Chattahoochee (*chăt′tȧ hōō′chē*), a river in Georgia, which takes its rise in the northeast part of the state, in the Blue Ridge Mountains, and, flowing south, between Georgia and Alabama, unites with Flint River to form the Appalachicola. Its length is over 500 miles, and it is navigable for over 200 miles to Columbus. It is famous in literature as the subject of Lanier's pcem, *The Song of the Chattahoochee.*

Chat′tanoo′ga, Tenn., a city, the county seat of Hamilton County, on the Tennessee River and on a number of railway trunk-lines. For eight or nine months of the year the river is navigable as far as Chattanooga. It is the seat of the University of Chattanooga, McCallie Preparatory School, Baylor School, Girls' Preparatory School, and also of Baroness Erlanger Hospital; it has many fine civic buildings, an opera house, public library and a number of attractive churches and fine schools. The city has a large trade in coal, iron, grain and lumber, its industries embracing the manufacture of steel and iron, machinery of various kinds, furniture, bricks and tiles, cotton goods, carriages and cars. In the vicinity is the Chickamauga National Military Park, marking the scene of the battle of Chickamauga (Sept. 1863). During the Civil War the city and neighborhood were the scenes of much and calamitous fighting, the city especially suffering. A sad evidence of the bloody struggle of the era is the national cemetery here, which contains about 13,400 graves. Population, 57,000.

Chattanooga, Battle of, a series of bloody engagements, in the Civil War, fought at Chattanooga, Tenn., and immediate neighborhood, Nov. 23-25, 1863, between the Federal army (60,000 strong) under General Grant and the Confederate forces (numbering 40,000) under General Bragg, and ending disastrously for the south. The battle had for its initial acts the expulsion of Bragg by Rosecrans from Chattanooga, and the battle fought at Chickamauga (Sept. 19-20, '63), in which the Union army was defeated and driven back to Chattanooga, where General Thomas, who had succeeded Rosecrans in command of the Army of the Cumberland, was besieged by Bragg. At this juncture General Grant, who had been placed in command of the northern armies operating in the region, came on the scene, bringing with him General Sherman with a part of the Army of the Tennessee, Hooker with reinforcements from the east having just preceded them. Ordering Hooker's corps to attack Bragg's left, Grant entrusted to Sherman the duty of attacking the southern right, while Thomas was to engage the center. Hooker forced his way up Lookout Mountain and had a notable engagement with the enemy in what is romantically known as the Battle above the Clouds, afterwards gaining a position on Bragg's left and rear. Sherman's attack met with stubborn resistance, and desperate fighting ensued without decisive results. Finally the forces under Thomas charged and carried the enemy's rifle-pits at the foot of the Ridge and in the absence of orders, rushed up the steep face of Missionary Ridge, and won the crest and the day. The storming of this Ridge has been noted as one of the most heroic achievements of the war, besides being vitally disastrous to Bragg and his army, which retreated toward Atlanta. See *War of the Rebellion Records*, also *The Army of the Cumberland* and *Battles and Leaders of the Civil War.*

Chaucer (*cha′sẽr*), **Geoffrey,** English poet and man of affairs, was born about 1340. Of his early boyhood we know nothing. At the age of seventeen we find him a page in the service of the wife of the Duke of Clarence, and at nineteen see him in the army of Edward III fighting the French, when he was taken prisoner, but later on was ransomed. He married about 1360 the sister of the future wife of John of Gaunt. He was given a pension by the king, and sent afterward to the Continent as commissioner or diplomat. In 1386 he lost two of the offices he was holding, why we know not, and from that time until his death misfortune pursued him. He seems never to have made provision for old age, and now many dark days came to him, though things went a little better when Henry IV, the son of his old friend, John of Gaunt, came to the throne. While on the king's business he visited Italy, and we find in most of his poems indications that his idea of poetry, what it is and should be, as well as his style and many of his plots and subjects, were taken from the great Italian poets, Dante, Petrarch and Boccaccio. The first of his great poems was *Troilus and Cressida*, but not until the darkness of poverty and old age came upon him, did he write the *Canterbury Tales*, of which the *Prologue* is the chief work. The *Tales* are related by a company of pilgrims on their way to Canterbury, who gather at an inn and agree each to tell a tale in going and returning; he who should tell the best tale was to be treated by the others with a supper at the inn. Chaucer is called the father of English poetry. He is the first great poet of the race. His finest service, however, lay in the fixation of the English language as a literary medium. He established spelling and grammatical usage, and raised the language to a dignity previously unknown. He invented the seven-line stanza and the heroic couplet. His work was so pure that Spenser called him "that welle of Englishe undefyled." Chaucer died about 1400, and was buried in Westminster Abbey.

Chaudière (*shō-dyâr'*), a river about 120 miles long, which flows through the southern portion of the province of Quebec, Canada. Its source is in Lake Megantic, and it joins the St. Lawrence River seven miles above Quebec. Near its mouth occurs one of the cataracts known as Chaudière Falls, which is about 100 feet high. Another Chaudière Falls occurs in the Ottawa River, near the city of Ottawa, the dominion capital. Ottawa is situated on the shore of Chaudière Lake.

Chautauqua (*shȧ-tô'kwȧ*), a popular resort on Chautauqua Lake in Chautauqua County, western New York. The name is of Indian origin. In 1874, Lewis Miller founded the Chautauqua Assembly here, for the instruction of Sunday School teachers. In 1878, Dr. John H. Vincent, the chancellor, established the home reading circle "to direct the reading habits of grown people." The four years' course has some 25,000 subscribers, scattered all over the world. The Chautauqua idea which is "a plea for universal education" has spread widely. A Chautauqua Institute was established from the Assembly sessions. Summer school courses were taught for sixty days each year. After 1923, New York University gave credits for work completed in the Chautauqua summer courses, which were attended by 45,000 in 1929. Hundreds of local assemblies have been modelled after this great Institute and helped to bring college to every-day life, which was Dr. Vincent's ideal for the movement.

Checkers or **Draughts,** a popular game played on a board marked off in squares. The rules of the game vary according to different countries. It was known in Egypt as early as 1600 B.C., and in ancient Greece. Modern checkers is played according to Chinese, English, Polish, Spanish, Italian, Turkish, New Zealand, French, Scotch and American rules. The familiar form in America is the game played by two persons, each being given twelve checkers of one color, either black or red or white. The checkerboard is divided into sixty-four squares, alternately black and red or white. At the beginning of the game, the checkers are placed on the three near lines of squares of one color. Moves are made diagonally across the board, one square at a time, to an unoccupied square, and always forward. The game is advanced by jumping over the enemy's men to an unoccupied square beyond, in which case the men jumped over are removed from the board. When the opponent's farthest line of squares is reached and occupied, the player's man is crowned by placing another checker of the same color on top of it. He then has a "king" which he may move freely back and forth as well as diagonally on the board. The game is won by clearing the board of the opponent's men or else by hemming them in so that he cannot move in any direction.

Chekhov (*chĕ'kŏ̇f*), **Anton Pavlovitch,** a famous Russian author, was born at Taganrog in southern Russia, in 1860. His parents were liberated serfs, but uneducated. Nevertheless they obtained a good education for their son. He was graduated from Moscow University in 1884, having completed a medical course. He was not interested in such a career, however, and soon decided to turn to literature. His early work began in 1879, when he wrote humourous sketches for periodicals under the pen-name of "Chekhonte." He belonged to the school of Gorki, Andreyev, and Artsybashev. Into his short life he crowded the production of over 150 short stories, a number of plays, and one novel. He became so popular in Russia that it was not uncommon for a collection of his work to sell rapidly through from ten to fourteen editions. His writings, most of which have been translated into German or French, and many into English, are characterized by their local color, portraying not only the outward appearance of Russia and Russians, but their inward character as well. Their plot is negligible. Available in English are short stories in periodicals; two collections: *The Black Monk and Other Stories* (1903), and *The Kiss and Other Stories* (1908) ; the plays *The Sea Gull* (1905) ; *The Cherry Garden* (1908) ; *Uncle Vanya and Ivanhoff* (1912). He died of tuberculosis in 1904.

Chelsea (*chĕl'sē̇*), a metropolitan and parliamentary borough of Greater London, is situated on the north bank of the Thames. It was formerly a suburban village of London. In the sixteenth and eighteenth centuries it was an aristocratic residence section. It has been the home of such famous people as Sir Thomas More, Princess Elizabeth, Walpole, Swift, Steele, Leigh Hunt, George Eliot, and Carlyle, who was called the "Sage of Chelsea." Chelsea was a famous haunt of Henry VIII. It is now a chief literary and artistic section of London. Among its notable buildings are the Church of St. Luke's built during 1307-1327; and the Chelsea Hospital for old and disabled soldiers, the foundation stone of which was laid by Charles II in 1682. Chelsea porcelain is internationally known, and has been famous since the eighteenth century. During the World War, Chelsea was bombed four times from the air. The population, according to the census of 1931, is 59,026.

Chelsea, a city of Suffolk County, Massachusetts, is situated three miles distant from Boston. It was settled as a part of Boston in 1625, became a town in 1739, and a city in 1857. It is connected with Boston by railway and electric line, and also by the Winnisimmett, the oldest ferry in the country, which was established in 1631. The city is very compact in area, comprising little more than two square miles. It is chiefly a residential city, but has manufactures of wall paper, boots and shoes, boxes, brass goods and pottery, rubber goods, hardwood veneers, woolens, lithographs, tiles, wireless apparatus, foundry and machine shops. The State Armory, Ye Olde Pratt House, and the United States naval hospital, which faces the Mystic River separating Chelsea from Charlestown, are among the more interesting buildings. In May, 1775 a sharp skirmish took place here between British troops and 1,000 Americans under Stark and Putnam. The towns of Winthrop and Revere were created out of parts of Chelsea. In 1908, a great fire almost completely destroyed the city, causing damage amounting to $17,000,000. The population in 1930 was 45,816.

Cheltenham (*chĕlt'năm*), a fashionable watering-place in Gloucestershire, England. It is situated 120 miles from London, in a valley on the Chelt River in the beautiful Cotswold Hills. The mineral springs were discovered in 1716, but the city did not become popular until 1788, when George III visited it and benefited from drinking its waters. The chief of the saline spas are the *Royal Old Well, Montpellier,* and *Pittville;* and the chalybeate spa is the *Cambray*. There are Roman ruins on the site of the town, and it is mentioned in the Domesday Book. The beautiful St. Mary's church is a fine example of Gothic architecture, dating from the fourteenth century. Cheltenham, which was incorporated as a city in 1876, is famous for its colleges and schools, especially the grammar school established in 1574, and Cheltenham College, founded in 1842. It is chiefly a residential city. The population, according to the census of 1931, is 49,385.

Chemistry. That field of knowledge which has for its subject the nature and composition of matter and the changes that take place in the composition and constitution of substance is termed chemistry. The particular changes that cause alteration of composition and constitution are called chemical changes in contrast to mere physical changes. Chemical changes instantaneously produce substances that have different properties from the reacting materials. Physical changes are changes in state without alteration of constitution. Then, too, they are usually more gradual and do not take place with the same abruptness. Among the changes that are constantly taking place in every day life that are examples of substances changing chemically are the rusting of iron whereby the familiar metal changes to a brown powder that has an entirely new set of properties from the iron from which it was produced; the combustion of gasoline in a motor car, to form the gaseous products that are driven through the exhaust pipe; the fermentation of grain or fruit juices to form alcoholic beverages; and the digestion of food to supply the energy for the body. Physical changes are exemplified by the heating of an iron rod, causing it to glow red, then white, and finally to soften, yet when the rod has cooled we have the original iron; the conversion of water into steam which on condensation again forms water. It has been repeatedly demonstrated by the most careful chemical work that if all the substances entering into a chemical reaction are weighed before and after the change, there is no gain or loss in total weight. Matter can neither be produced nor destroyed. This is a demonstration of the law of the conservation of mass.

Elements. The composition of all substances is included in the scope of chemistry. This forms the important branch of analytical chemistry which has to do with not only the kind of materials present (qualitative analysis) but also with the amount (quantitative analysis). The earth presents a bewildering array of different materials which the chemist has resolved into compounds and elements. While the number of compounds is large it has been found that they can be broken down into a comparatively small number of simple substances which cannot be reduced further. These substances are called elements and are the fundamental materials from which all matter is constructed. The number of these elements at the present time is ninety-two. At ordinary temperature some are gaseous, as hydrogen and helium; others liquid, as mercury and bromine; and most are solid, as the metals lead and platinum. Many elements were known to exist from the periodic table devised by Mendeleef and the atomic numbers assigned to the elements by Mosely, prior to their actual discovery. With the aid of the atomic numbers it was possible to postulate the existence of ninety-two elements between and including hydrogen and uranium. Since the opening of the present decade the last remaining few of the missing elements have been located so that the scale of ninety-two elements is complete. Although ninety-two elements are known they have not all been isolated from their compounds and a number have been proved to exist by means of delicate apparatuses as the spectroscope, the gold leaf electroscope, and the recently developed magneto-optic method.

For many years scientists have doubted the existence yet sought to discover or create element 93. In the early part of 1934, a young Italian scientist, Fermi by name, announced that he had created a heavy substance which appeared to be element 93, by bombarding uranium, the heaviest known element, with neutron rays. This artificial substance, however, disintegrated in twelve minutes. In July of this same year there was announced by Dr. O. Koblic in the British official scientific journal a discovery of the rarest, heaviest and costliest basic substance yet revealed by scientific investigation. A pinch of yellow salt, about 115 milligrams, was extracted from pitchblende in Czechoslovakia. The Czechoslovakian discovery indicates that element 93 is more closely associated with actinium (element 89) than with uranium (element 92). This first real evidence of element 93 is tangible, an inert substance (does not disintegrate rapidly enough to call attention to its presence) which science up to this time supposed to exist only in the hot interior of the stars.

The abundance of the elements varies greatly. In the case of oxygen, it forms about fifty per cent of the earth's crust, about twenty per cent of the air, and approximately ninety per cent of water. Silicon, the element of quartz and sand, makes up about twenty-five per cent of the surface rocks; aluminum, which is the principal metal of clay, about seven per cent, and iron about five per cent. Calcium, magnesium, sodium and potassium come next in order and in no case does any one of the remaining eighty-four elements form as much as one per cent of the earth's crust. Most of the recently discovered elements exist only in the most minute quantities so that it is only with a great deal of labor and expense that sufficient material has been gathered to study them. Helium, the gaseous element which is now used to inflate balloons, was discovered spectroscopically in the atmosphere of the sun many years before it was found on the earth. The atmosphere contains, besides oxygen and nitrogen, about one per cent argon and minute amounts of helium, neon, krypton, and xenon. The element carbon exists in limestone which forms an important class of sedimentary rocks and has a wide distribution in the earth's crust. Coal is an impure amorphous form of the element which occurs in the crystalline state as graphite and the diamond. Carbon is principally of interest because it is the one element that is present in all living substances. The carbon dioxide of the air plays an important rôle in plant economy. Together with water, compounds of nitrogen and minerals of the soil, it forms the food of the plant kingdom. The oxygen which plants give off as a waste gas is returned to the air and is utilized by animals which depend on it for existence as plants do on the carbon dioxide. In this manner plants and animals complement each other. Then too, plants form the principal food of animals which the latter make available to plants as waste matter and through the decay of organisms. It is due to the property that carbon has of uniting into chains and rings that we have hundreds of thousands of compounds that are studied under the heading of organic chemistry. In the early period of the science, life force was considered necessary for the production of carbon compounds and it was thought that they could not be produced by any other means. Therefore, their chemistry was called organic chemistry, and by way of distinction all compounds not containing carbon were classed as inorganic. In 1828, Wohler prepared urea, an important decomposition product of compounds of nitrogen in the animal body, artificially from purely inorganic sources, and thereby broke down the distinction between the two branches of chemistry. The general classification has been retained, however, as a matter of convenience because of the importance and the large number of carbon compounds. Today, organic chemistry is more correctly the chemistry of carbon compounds. Many organic compounds found in nature have been synthesized from the elements in the laboratory and many compounds have been made which are pure laboratory products and have not been found in nature at all.

During the opening years of the present century, Madame Curie discovered the element radium, which upset the previous notions held as to the permanence and immutability of the elements. Alchemy in the ages that preceded the time when chemistry was formulated as a science, had for one of its objectives the transmutation of one element into another, but always the attempts ended in failure and it remained for the discovery of radium to show how one element could change into another. Radium was found to change spontaneously through a series of different elements and finally to end with lead; and this in spite of what man could do to hinder or abet this change. (See CURIE, MADAME.)

Atomic Theory. The atomic theory states that all elements are composed of minute particles called atoms which differ from each other in kind of element and in mass. The relative masses of the atoms with oxygen as sixteen, is called the atomic weight. These atoms have the property of uniting with each other to form compounds, the smallest unit of which is the molecule. The term "atom" can only be applied to an element, whereas a molecule may be a union of several atoms of the same element or an aggregation of atoms of different elements; in the latter case, we have a compound. For a long time, the atom was considered the smallest part of matter, and not capable of subdivision, as its name indicates. Later investigations revealed the existence of electrons (negative electricity) and protons (positive electricity) within the atom; and that the atoms of elements differed from each other solely in the number and disposition of protons and electrons in the individual atoms. The protons are grouped together in what is called the nucleus and most of the electrons revolve about this nucleus in orbits somewhat resembling the revolution of the planets about the sun in the solar system. Thus it was seen that an element might be changed into another by changing the number of electrons and protons in the atom. This is what was actually taking place in the case of radium. As radium decomposes it gives off alpha rays, which are positively charged helium atoms; beta rays which are electrons travelling at high velocities, and gamma rays which are short wave radiations similar to X-rays. The positively charged helium atoms are called helium ions and carry a part of the mass of the atom from the nucleus (which contains practically all of the mass). By the removal

THE CHEMICAL ELEMENTS

ELEMENT, SYMBOL	ATOMIC NUMBER	ATOMIC WEIGHT	VALENCY	DENSITY	MELTING POINT	YEAR DISCOVERED	DISCOVERER
Actinium (Ac)	89	226.	3	....	......	1898	DeBierne, Giesel
Alabamine (Ab)	85	221.0	....	....	......	1930	Allison
Aluminum (Al)	13	26.97	3	2.69	660.	1827	Wohler
Antimony (Sb)	51	121.7	3, 5	6.69	630.5	1450	Valentine
Argon (A)	18	39.94	0	1.59*l*	–185.7	1894	Rayleigh, Ramsay
Arsenic (As)	33	74.93	3, 5	5.72	......	13th C.	Magnus
Barium (Ba)	56	137.36	2	3.6	850.	1808	Davy
Beryllium (Be)	4	9.02	2	1.84	1280.	1828	Vauquelin
Bismuth (Bi)	83	209.0	3, 5	9.8	271.	15th C.	Valentine
Boron (B)	5	10.82	3	1.73	2300.	1808	Guy-Lussac, Thenard
Brevium (Bv)	91	234.	2, 3	....	......	1913	Fajans
Bromine (Br)	35	79.916	1	3.14*l*	–7.	1826	Balard
Cadmium (Cd)	48	112.41	2	8.6	320.9	1817	Stromeyer
Cæsium (Cs)	55	132.81	1	1.87	26.	1861	Bunsen, Kirchoff
Calcium (Ca)	20	40.08	2	1.55	810.	1808	Davy
Carbon (C)	6	12.000	4	1.86	3500.	B. C.	....
Cerium (Ce)	58	140.13	3, 4	6.8	640.	1839	Mosander
Chlorin (Cl)	17	35.457	1	1.55*l*	–101.6	1774	Scheele
Chromium (Cr)	24	52.01	2, 3, 6	7.1	1600.	1897	Vauquelin
Cobalt (Co)	27	58.94	2, 3	8.8	1480.	1735	Brandt
Columbium (Cb)	41	93.1	5	8.4	1950.	1801	Hatchett
Copper (Cu)	29	63.57	1, 2	8.93	1083.	B. C.	....
Dysprosium	66	162.46	3	....	......	1907	Boisbaudran
Erbium (Er)	68	167.64	3	4.77	......	1843	Mosander
Europium (Eu)	63	152.0	3	....	......	1901	Demarcay
Fluorin (F)	9	19.00	1	.0017*g*	–220.	1886	Moissan
Gadolinium (Gd)	64	157.26	3	....	......	1886	Marignac
Gallium (Ga)	31	69.72	3	5.9	29.7	1875	Boisbaudran
Germanium (Ge)	32	72.60	4	5.4	958.5	1886	Winkler
Gold (Au)	79	197.2	1, 3	19.3	1063.	B. C.	....
Hafnium (Hf)	72	178.6	0	13.3	2200.	1923	Coster, Hevesy
Helium (He)	2	4.002	0	0.5*l*	–272.	1895	Ramsay
Holmium (Ho)	67	163.5	3	....	......	1886	Boisbaudran
Hydrogen (H)	1	1.0078	1	.000087*g*	–259.4	1766	Cavendish
Illinium (Il)	61	....	3	....	......	1926	Hopkins
Indium (In)	49	114.8	3	7.25	155.	1863	Reich, Richter
Iodine (I)	53	126.932	1	4.94	113.5	1811	Courtois
Iridium (Ir)	77	193.1	4	22.4	2350.	1804	Tennant
Iron (Fe)	26	55.84	2, 3	7.86	1530.	B. C.	....
Krypton (Kr)	36	83.7	0	0.0037*g*	–160.	1898	Ramsay, Travers
Lanthanum (La)	57	138.90	3	6.15	826.	1839	Mosander
Lead (Pb)	82	207.22	2, 4	11.34	327.5	B. C.	....
Lithium (Li)	3	6.940	1	0.534	186.	1817	Arfredson
Lutecium (Lu)	71	175.0	3	....	......	1907	Welsbach, Urbain
Magnesium (Mg)	12	24.32	2	1.74	650.	1830	Liebig, Bussy
Manganese (Mn)	25	54.93	2, 3, 7	7.3	1260.	1774	Gahn
Masurium (Ma)	43	....	2, 3, 7	....	......	1925	Noddaek
Mercury (Hg)	80	200.61	1, 2	13.60	–38.9	B. C.	....
Molybdenum (Mo)	42	96.0	4, 6	10.2	2620.	1790	Hjelm
Neodynium (Nd)	60	144.27	3	7.00	840.	1885	Welsbach
Neon (Ne)	10	20.183	0	.000900*g*	–249.	1898	Ramsay, Travers
Nickel (Ni)	28	58.69	2, 3	8.8	1452.	1751	Cronstedt
Nitrogen (N)	7	14.008	3, 5	0.95*s*	–210.	1772	Rutherford
Osmium (Os)	76	190.8	6, 8	22.48	2700.	1804	Tennant
Oxygen (O)	8	16.000	2	.001429*g*	–219.	1774	Priestley, Scheele
Palladium (Pd)	46	106.7	2, 4	11.5	1555.	1803	Wollaston
Phosphorus (P)	15	31.02	3, 5	1.8 to 2.7	44.	1674	Brandt
Platinum (Pt)	78	195.23	2, 4	21.4	1755.	16th C.	Wood
Polonium (Po)	84	210.0	2, 4, 6	....	......	1898	Curie
Potassium (K)	19	39.10	1	0.86	63.	1807	Davy
Praseodymium (Pr)	59	140.92	3	6.6	940.	1885	Welsbach
Radium (Ra)	88	225.97	2	5.	960.	1898	The Curies, Bemont
Radon (Rn)	86	222.0	0	.00973*g*	–113.	1900	The Curies, M., Mme.
Rhenium (Re)	75	186.3	......	21.2	3000.	1925	Noddaek
Rhodium (Rh)	45	102.91	3	12.3	1950.	1803	Wollaston
Rubidium (Rb)	37	85.44	1	15.2	38.	1861	Bunsen, Kirchoff
Ruthenium (Ru)	44	101.7	6, 8	12.28	2450.	1845	Claus
Samarium (Sa)	62	150.43	3	7.7	1300.	1879	Boisbaudran
Scandium (Sc)	21	45.10	3	2.5	1200.	1879	Wilson, Cleve
Selenium (Se)	34	79.2	2, 4, 6	4.6	220.	1817	Berzelius
Silicon (Si)	14	28.06	4	2.33	1420.	1823	Berzelius
Silver (Ag)	47	107.880	1	10.50	960.5	B. C.	....
Sodium (Na)	11	22.997	1	0.97	97.5	1807	Davy
Strontium (Sr)	38	87.63	2	2.60	782.	1808	Davy
Sulphur (S)	16	32.06	2, 4, 6	1.96 to 2.07	104. to 120.	B. C.	....
Tantalum (Ta)	73	181.4	5	16.6	3000.	1802	Eckeberg
Tellurium (Te)	52	127.5	2, 4, 6	6.25	453.	1782	Von Reichenstein
Terbium (Tb)	65	159.2	3	....	......	1843	Mosander
Thallium (Tl)	81	204.39	1, 3	11.85	303.5	1861	Crookes
Thorium (Th)	90	232.12	4	11.5	1842.	1828	Berzelius
Thulium (Tm)	69	169.4	3	....	......	1879	Cleve
Tin (Sn)	50	118.70	2, 4	7.28	231.8	B. C.	....
Titanium (Ti)	22	47.90	4	4.5	1800.	1789	Gregor
Tungsten (W)	74	184.0	6	19.1	3380.	1783	d'Elhujar
Uranium (U)	92	238.14	4, 6	18.7	1690.	1841	Peligot
Vanadium (V)	23	50.95	3, 5	5.7	1710.	1831	Berzelius
Virginium (Vi)	87	225.0	1	....	......	1930	Allison
Xenon (Xe)	54	131.3	0	.0058*g*	–112.	1898	Ramsay, Travers
Ytterbium (Yb)	70	173.5	3	....	......	1878	Marignac
Yttrium (Yt)	39	88.92	3	4.57	1490.	1828	Wohler
Zinc (Zn)	30	65.38	2	7.14	419.	B. C.	....
Zirconium (Zr)	40	91.22	4	6.53	1900.	1825	Berzelius

of the protons from the nucleus, an element of smaller atomic weight has been produced. In recent years disintegration of atoms has been accomplished in the laboratory to a small extent through the aid of electrical discharges at enormously high voltages.

Compounds. Only very few of the elements exist in the free state, the majority being combinations with other elements to form compounds. Such combinations may be simple, as one atom of one element with one atom of another, as sodium chloride or common salt, which contains one atom of sodium and one atom of chlorine; or they may be complex, as some of the carbon compounds which may contain thousands of atoms in a single molecule. Whenever a given compound is analyzed, it is found that it always contains the same atoms and the same molecular weight. This is particularly true of carbon compounds. For example, dimethyl ether and ethyl alcohol are two such compounds having the same atoms and molecular weight, and yet they are totally different in properties. This the chemist has explained by the arrangement of the atoms in the molecule.

History. Chemistry as a science dates back to less than two hundred years. Previous to this time, chemical knowledge was shrouded in mystery and every effort was made to conceal the results of experiments by symbolic and cryptic writings. It was not until toward the close of the eighteenth century that the true explanation of the phenomenon of combustion was given. With the establishment of the quantitative method at this time, a real impetus was given to discovery, which has continued to the present day. The scientist turned his attention to the materials of the earth and its living forms, the waters upon it and the air above, and even to the stars in the heavens whose composition has been revealed by the spectroscope.

To-day chemistry has a most important part to play in our civilization. Upon it depend so many of the comforts and necessities of life. It has entered into almost every industry. Natural products have been analyzed in the laboratory, their constitution established and methods developed for their synthesis. In this way many compounds have been manufactured which previously could only be obtained by costly and laborious handling of natural materials to separate the desired constituents. This has notably been true in the case of organic compounds. Modern dyes have almost completely supplanted natural coloring materials, such as madder and indigo which at one time were cultivated extensively; artificial silk, so common to-day, is a contribution of the chemist. In the field of medicine, chemistry has done much to alleviate pain and to combat disease. Agriculture has been benefited by improved fertilizers and insect control. Metallurgists have developed alloys to meet the demand for hardness, durability and non-corrosiveness. And so might be mentioned at length the importance of the science in every day living.

George M. Johnson.

Chemotaxis (*kĕm-ō-tăk′sĭs*), the sensitiveness of a free-swimming organism to chemical substances held in solution, to which it responds by assuming a definite attitude with respect to the direction from which the subject is diffusing, being either attracted or repelled. It is fundamentally the same as chemotropism, although the reaction differs. It may be observed in zoöspores of various algæ and fungi, sperms of mosses and ferns, and many bacteria. The plants must be immersed in water to thus orient themselves, and the substance must be soluble and diffusible in water. The action is illustrated by the sperms or male cells of mosses which will so place themselves in a diffusing current of sugar particles that they move toward the source of the sugar as they swim. Chemotaxis is believed to determine the movement of the sperms toward the egg in many plants.

Chemotropism (*kē-mŏt′rō-pĭz′-m*), the sensitiveness of a plant to a dissolved chemical substance to which it responds by changing the rate of its growth in certain regions, and curving toward or away from the stimulus. Diffusing gases or solutes may effect the reaction. Thus, a root is chemotropic toward a substance and the side nearest will become convex, the opposite side concave. Elongating organs, as roots and fungus filaments, have a reaction of growth. In any case, the organ tends to place itself so that it will be equally stimulated on all sides by the diffusing chemical substance. The growth of the germ-tubes arising from growing spores of fungi is directed by their chemotropism. When a spore falls upon a leaf in or on which the fungus can develop, it sprouts; and when the young germ-tubes reach the stomata they turn in and ramify themselves in the interior of the leaf, or else at once penetrate an epidermal cell. It has been proved in either case that the directive influence is the presence of foods in the leaf. Pollen-tubes are similarly controlled in their growth. See Fertilization; Irritability.

Cheops. See Pyramids.

Cherbourg. See Breakwater.

Cherokees (*chĕr-ō-kēz′*), a tribe of North American Indians of Appalachian stock, who dwelt on a wide tract of land in the upper Tennessee River valley and either side the southern Appalachian mountains. They occupied sixty-four towns, and were one of the most civilized tribes in America. The English colonists afforded their first contact with the white man and in consequence they became their friends and joined them in warring on the French. After fighting for the colonists, they were driven by hunger on the homeward march, to rob the settlers of provisions. This resulted in a war between the Cherokees and English, from 1757-61. After losing most of their cattle, horses, and houses, they yielded to the whites. During the Revolution they assisted the British. After the war a part of the tribe moved west of the Mississippi to find better hunting-grounds, and in 1838 the government removed the remainder. In the Civil War they divided, Cherokees being in each army. The tribe learned several kinds of manufacturing, gradually gave up hunting, and up to the outbreak of the war held many slaves. There have been schools and missions among them for a long time. They are also rich, the government holding for them over $1,500,000. They number about 14,000.

Cher'ry, certain species of the genus *Prunus*, which belongs to the rose family. The cultivated tree-cherries are said to have come from two European species. The berries are also distinguished in general as sweet and sour cherries. It is the latter kind which is usually cultivated for canning, the sweet cherries being mostly confined to dooryard planting. In Japan cherries are specialized for their beauty, Cherry-blossom time being a holiday season. Our wild red cherry, pin, bird or pigeon cherry, is a graceful little tree, its bark smooth and shining, its leaves ever twinkling, and none could pass it by unnoticed in April and May, then all snowy, fragrant bloom. Its rich red fruit is a prime favorite with the birds. This tree, a quick grower and short-lived, is an excellent nurse for young forest trees. The choke-cherry is generally but a shrub, though attaining considerable size in the region lying between Nebraska and northern Texas. Both in time of blossoming and in fruit-bearing it is very attractive, the blossoms having long, fleecy bunches. Later the branches droop with the long stems aset with glowing gems, changing through various shades of yellow and red to the dark crimson of the ripe fruit —occasionally yellow when ripe. The fruit is very good to look at but very bitter to eat, puckery and harsh to the taste.

The wild black cherry or rum-cherry, is a very valuable timber tree. It grows to the height of 50 to 90 feet, the polished wood, a rich, lustrous brown, rivalling mahogany and rosewood. It was once abundant on the Alleghany slopes, but is now quite scarce. See Rogers: *The Tree Book*; Lounsberry: *A Guide to the Trees.*

Cherubini (*kä-roo-bē'nē*), **Maria Luigi Carlo Zenobio Salvatore,** an Italian composer, was born at Florence in 1760. He began to study music at the age of six. He produced successful operas, and in 1800 brought out one of his masterpieces, *The Water-Carrier.* Soon after he turned his mind to church-music, in which he became very distinguished, his first work being the *Mass in F.* His operas resembled Mozart's in many respects. He died March 15, 1842.

Chesapeake Bay (*chĕs'ȧ-pēk*), meaning mother of waters, the greatest inlet in the Atlantic coast of the United States, enters Virginia and extends into Maryland. It is 200 miles long and from four to forty miles wide. Cape Charles and Cape Henry mark its entrance. It receives the Susquehanna, Potomac, James and other rivers. The Chesapeake is so deep that the largest ships can steam up its entire length. It is also the most southern of the deep-water bays, all those to the south being shallow.

Chesapeake, The, a frigate of the United States Navy, historically noted in the War of 1812 with Great Britain and in the preliminary impressment-controversy period. The latter period was the one when the British government refused to recognize the naturalization abroad of her subjects as absolving them from their inalienable allegiance. In the intercourse between this country and England, early in the last century, it was a frequent practice on the part of British seamen, when their ships touched at American ports, to desert and become American subjects. This naturally offended England and annoyed the captains and officers of her ships when desertions occurred on this side; so much so that it became a frequent occurrence to overhaul American ships and take from them deserters and even American subjects on the high seas. One instance of this connects itself with the United States frigate, *The Chesapeake*, which soon after sailing from Hampton Roads, on June 22, 1807, was overhauled for deserters by the British warship *Leopard.* Though unprepared for action, *The Chesapeake* resented the insult to the American flag and refused to submit to inspection or to surrender any of the foreign portion of her crew. At this *The Leopard* opened fire and forced *The Chesapeake* to haul down her flag and give up the three colored deserters aboard her. The unfriendly act, though disowned by Britain (the government of the latter refusing all redress) did much to embroil the two nations and precipitate the War of 1812–14. When the latter was in progress, *The Chesapeake* was again to figure in a sharp encounter with a British warship, *The Shannon*, commanded by Captain Broke and carrying 52 guns. On this occasion, *The Chesapeake*, which was then commanded by Captain Lawrence, and had an armament of 50 guns, was in better shape than formerly to take her part in the action that followed, save that she had a practically untrained crew. The two frigates met just outside of Boston, on June 1, 1813, and at once an engagement ensued. So hot was the *Shannon's* fire, and so indifferently was it returned by her American adversary, that the encounter lasted but fifteen minutes, when *The Chesapeake* was forced to surrender, in spite of her gallant captain's charge to his men, as he was carried below mortally wounded: "Don't give up the ship." *The Chesapeake* became *The Shannon's* prize, and was taken by the latter into Halifax harbor, afterwards and for a few years sailing under the British flag. The casualties of the encounter were many on both sides; out of a crew of 379 *The Chesapeake* lost 61 in killed or mortally wounded, and 85 more or less severely wounded; *The Shannon's* losses (out of a crew of 330) were 33 killed and 50 wounded. See Cooper's *History of the Navy of the United States* and Roosevelt's *The Naval War of 1812*.

Chesapeake and 'Ohio Canal, a project, favored in 1774 by Washington, to connect the great inland lakes by a navigable waterway from Lake Erie across the Alleghenies, utilizing the affluents of the Ohio River, thence to tidewaters on the Potomac. The undertaking was not in his day put into effect; though in 1820 it was revived by the state of Virginia, and a company was organized to construct the Chesapeake and Ohio Canal, from Georgetown, D. C., to Cumberland, Md., by utilizing the waterway of the Potomac and tunneling the mountains beyond Paw-Paw Bend, thence to Cumberland. The project was completed in 1850, at a cost exceeding 11¼ million dollars. The canal has a length of 185 miles, and by means of about 75 locks (100 feet in length by 15 feet in width) it gains a total elevation of over 600 feet, the water being supplied by the Potomac. The depth of the canal is 6 feet, while its width to Harper's Ferry is 60 feet on the surface and 42 feet at the bottom. The continuation of the canal to tap the inland lakes is a matter still in the future; though of late the city of Pittsburg, Pa., has taken hearty interest in the scheme, both by urging the Federal authorities to carry the canalization of the Monongahela River south to Fairmont, W. Va., and by planning to construct a canal, 16 feet deep and estimated to cost over $30,000,000, from Pittsburg to Ashtabula, Ohio, on Lake Erie.

Chess, a game played with pieces of different value upon a board chequered in two colors and divided in sixty-four squares, is the most ancient of all the current games of skill. Chess is probably of Asiatic origin, although a game similar to it was known to the Egyptians. One of the earliest books to be printed in English was Caxton's *Ye Game and Playe of ye Chesse* (1479). The literature upon chess is at the present time enormous.

The pieces at the disposal of each player are a king, a queen, two bishops, two knights, two castles or rooks and eight pawns. The king moves in any direction one square; the queen, so far as the board is free, either diagonally or horizontally; the bishop, diagonally on its own color; the knight, one square horizontally or vertically and one square diagonally; the castle, horizontally and vertically; the pawns, to the next square in front. For the peculiar moves in castling, capturing and moving two squares with pawns, and "queening" the pawn, the reader is referred to books upon chess.

In theory, since the forces of each player are equal, every game of chess if rightly played should end in a draw. But the charm of chess arises from its infinite variety. No two games are alike. None the less, the best openings in chess have been reduced to a science, so that the earnest student of the game needs to practise the standard openings as given in books. There is no better plan for the learner than to play over the published games of the great masters.

The strategy of chess imitates that of war. The king is for each player the final object of attack and defence. Often, however, it is better to direct the attack upon some other piece, and to weaken the enemy before attempting to checkmate him. A king is checkmated when he is attacked in such a manner that if he were not the king he must needs be taken. The value of chess as a mode of mental recreation is almost beyond praise. At the same time it may be too serious a study for the good of the scholar whose mind is overtaxed by mental work. Moreover, the virtue which chess is held to possess, of training the mental powers for other purposes than the game itself, would seem to have been exaggerated.

Ches'ter, a city in Delaware County, Pa., on the Delaware River, 13 miles from Philadelphia. It has a military and other colleges, shipbuilding yards and manufactures cotton and woolen goods, engines, etc. It was founded by the Swedes in 1643, and is the oldest town in the state. Population 65,000

Ches'terfield, Philip Dormer Stanhope, Lord, was born in London, Eng, Sept. 22, 1694. He studied at Cambridge, and was a member of Parliament. He was acquainted with Swift, Pope, Johnson and other authors. It was by offering his patronage to Dr. Samuel Johnson, after his famous dictionary appeared, though he had withheld it before, that he drew from the indignant Johnson the witty letter declining the courtesy that is so famous in English literature. Chesterfield is best remembered by his *Letters to His Son*. He died March 24, 1773.

Chest'nut, species of the genus *Castanea,* which is closely related to the beech. There are about five species, which occur in the temperate regions of northeastern America, Europe, northern Africa and Asia. The peasants of Italy and Spain regard the chestnut as quite important. This chestnut is not sweet like ours, but very good when cooked. Three species are cultivated in this country for the fruit, namely, the European chestnut (*C, sativa*), also known as French, Spanish and Italian chestnut; the American chestnut (*C. Americana*); and the Japanese chestnut (*C. crenata*).

The European chestnut is a tall, spreading tree the burrs very large, the nuts larger than the American chestnut, The Japanese chestnut is a dwarfish, slender tree and bears very large nuts, in quality generally not equal to the other chestnuts, although excellent when cooked.

The American chestnut rises to a height of sixty to 100 feet, and is a symmetrical tree with a heavy top. The bark is gray. The glossy leaves, from six to eight inches long, taper at both ends, making foliage of marked beauty and abundance. The flowers are catkins, which open in June and July and exhale a sweet heavy odor. The fruit of the chestnut is the nut, large quantities of which are found in the forests of the Appalachian region, from Maine to Georgia in the east and westward to Michigan, Mississippi, and Louisiana. The tree is a valuable lumber-tree, the wood being used for interior finish, for furniture, railroad ties, fence posts and fuel.

A miniature chestnut is the chinquapin, which grows from Pennsylvania to Florida and west to Arkansas and Texas. In the last two states it reaches the dignity of a tree, east of the Mississippi only a shrub. A single sweet nut is its fruit. Chinquapin nuts are on sale in their season in the markets of southern towns. The horse-chestnut does not belong to the same family as the above.

See HORSE CHESTNUT.

Cheviot (*chē'vē-ŭt*) **Hills**, a mountain range in Northumberland and Roxburgh Counties, on the English and Scottish borders. It is thirty-five miles long, and rises to a height of 2,658 feet in Cheviot Hill, the highest point. These hills are now used as pasture-lands for the fine Cheviot sheep. They were famous in border warfare between England and Scotland, and are commemorated in the old ballad, *Chevy Chase.*

Chevron (*shĕv'rŭn*), a distinguishing mark to indicate rank or service, consisting chiefly of bars meeting at an angle, on the coat sleeve of non-commissioned officers, soldiers, policemen, and on the shield in heraldry. In the United States service rank is indicated by two bars for the corporal, three bars for the sergeant, three bars and a diamond for the first-sergeant, three bars and a ring for the color-sergeant. The chevrons are worn with the points up, midway between the elbow and the top of the sleeve, and on all coats. If no coat is worn, they appear on the sleeve of the army shirt, and are of a color corresponding to the khaki color of the service uniform, on a black background. Post permanent staff, engineer, hospital, ordnance, and signal corps non-commissioned officers wear with the chevrons usually a cloth device which designates their corps or department of service. The chevrons are not to be confused with service stripes, which are worn diagonally on both sleeves below the elbow, one stripe for each three years of faithful service. During the World War, *wound chevrons* of gold braid, to be worn on the right sleeve below the elbow, were awarded to each officer and enlisted soldier who was either wounded in action or disabled by gas. The *war service chevron* is a similar device, in gold to designate six months service overseas, and in silver to designate six months service in the United States. Chevrons of varying number and design are worn in practically every civilized army, for the same purpose. The English and French systems most nearly resemble that of the United States. Policemen and some such public officers also wear similar devices, designated in their service as chevrons. In heraldry, the chevron consisted of an honorable ordinary formed of two bars one-fifth the width of the shield, which issued obliquely from the dexter and sinister bases and joined in the center. The word chevron is also used to designate a V-shaped ornament or zigzag pattern in architecture, especially a zigzag fret or molding in Romanesque architecture. Chevrons were used commonly by the Assyrians, and in French-Norman and Anglo-Norman architecture of the eleventh and twelfth centuries.

Chevy Chase. See BALLADS.

Cheyenne (*shī-ĕn'*), a tribe of Indians belonging to the great Algonquin family, who originally inhabited Wyoming. They were found by the travellers, Lewis and Clarke, in 1803, on the Cheyenne River near the Black Hills. The tribe afterward divided, one part remaining in the north, becoming affiliated with the Dakotas, and the other going south to join the Kiowa of the South. There resulted the Southern and Northern Cheyenne Indians. Treaties were made between both bands and the United States; but failure to carry out a treaty made in 1861 and an inhuman attack, made in 1864, by whites on what is known as Sand Creek village, killing 100 Cheyenne men, women and children, drove the tribe into the field against the whites for the first time. This war cost the government many lives and about $30,000,000. The troops of General Hancock and Custer, in 1867, forced them to go on a reservation. The unjust treatment suffered by the Cheyennes has great bearing upon their attitude toward the government. They do not take kindly to schools. To-day there are about 3,500 Cheyenne Indians in the United States. About 1,000 dwell on reservations in Montana and the remainder in Oklahoma.

See INDIANS; OKLAHOMA; WYOMING.

Cheyenne, the capital of Wyoming and the seat of Laramie County, is situated about 105 miles north of Denver, Colorado. It was founded in 1867, when the Union Pacific Railroad reached that point. In 1869, it became the territorial capital and was swept with fire in the same year. It is a center of the cattle industry and a shipping place of beef cattle in particular. It is also a supply point for surrounding ranches and mining camps. Large railroad shops are located here. The population in 1930 was 17,361.

See WYOMING.

Chicago (*shē-kô'gō*), "Queen of the Middle West", the second largest city in the Western Hemisphere, the fourth largest city of the world, and the seat of Cook County, Illinois, is situated on the southwestern shore of Lake Michigan at the junction of the Chicago and Calumet Rivers. It extends twenty-five and a half miles along the lake front. The site occupied by the city of Chicago is "a natural crossroads between the industrial East and the agricultural West, the ore-producing North and the cotton-growing South." It lies 912 miles distant from New York City, 2,274 miles from San Francisco, 915 miles from New Orleans, and 479 miles from Duluth. In 1833 when incorporated, Chicago had an area of but 2.8 square miles. To-day this city extends over an area of 210.7 square miles or 133,800 acres. Since August 10, 1833, when the 200 or less settlers of Fort Dearborn witnessed the incorporation of "Che-cau-gou" as a town, on down to the present day when Chicago, now a city of 3,376,438 inhabitants is celebrating the reopening of its "Century of Progress Exposition" its growth has been a human story.

Chicago Plan. Chicago's development from a village of but forty-three huts to one of the world's greatest modern cities has not been a result of mere fortune but of careful and efficient planning. The spirit of the city's slogan "I Will" which was adopted in 1892, has been a great influence in spurring Chicagoans onward and encouraging those builders who seek to push forward, and, in the words of the American author, Bret Harte, create the

> "Queen of the West; by some enchanter taught
> To lift the glory of Aladdin's Court."

It was the historic Chicago Fire of 1871 that aroused the spirit of Chicagoans and cemented a determination to make Chicago "rise again." Chicago's motto "I Will" is represented by a Woman wearing a phoenix with outspread wings for a crown. She stands erect, clothed in a classical gown. In her hand she carries a carpenter's square and her wrists are bound with the leather braces of an athlete. This motto was extensively used on "Century of Progress" posters. The Chicago World's Fair of 1893 succeeded in making Chicagoans and the American people in general increasingly conscious of the growing importance of industrial power, and of achievement in art, literature and science. To-day that spirit of the early settlers which has been at work for nigh onto a century is manifest in Chicago's achievements and claims to greatness.

Soon after the World's Fair of 1893, Daniel Burnham conceived the idea of developing an orderly and efficient plan for the city of Chicago. The idea was presented to the business men of Chicago in 1907. In 1909 the Chicago Plan Commission was organized with Charles H. Wacker at its head. The plan formulated by the Commission proposed to improve the lake front, develop an outer park system which would skirt the city limits and to so arrange the city's thoroughfares so as to relieve traffic congestion in and out of the business district. Work, which was soon to be interrupted by the World War, was put under way. In the years which followed much was done toward rearranging Chicago land, widening its boulevards, and constructing those towering edifices which to-day border north Michigan Avenue and Wacker Drive. New plans are being constantly moulded to achieve new and added beauty and greatness for Chicago, a city the Indians oftentimes referred to as "Gitchi-ka-go," meaning "great and strong."

The land about the city is a level tract which follows a rectangular outline. The Chicago River divides the city, by means of its northwest and southwest branches, into three areas, the North Side, the South Side and the West Side. Just south of the River lies "downtown" Chicago, that famous section encircled by elevated railways which is locally known as *The Loop.* Here are situated the principal banks, theatres, retail stores, clubs, hotels and Chicago's financial district. Here too stands Chicago's City Hall Square a massive structure situated between Washington, Clark, La Salle and Randolph Streets. Each day this section of the city fairly swarms with office workers, bankers, lawyers, city and county officials, merchants, restauranteurs, and that throng of shoppers who have made "State Street, Chicago", famous the world over. Even the street urchin invades *The Loop.* This section of the city which presents a solid and compact appearance, has many important interests segregated within its confines. Edgar Lee Masters, the poet, in one of his poems written several years ago, said of Chicago's *Loop.*

> "Around the Loop the Elevated crawls
> And giant shadows sink against the walls,
> Where ten to twenty stories strive to hold
> The pale refractions of the sunset's gold."

Thoroughfares. With the dawn of the twentieth century, Chicago entered upon a new era. During the first thirty-four years of this century much has been accomplished in city planning, although it might never occur to the millions who pass over Michigan Avenue, Wacker Drive or State Street that Indian trails, bumpy wagon paths or plank roads once laid here. It is indeed hard to picture wagons creaking along a trail that has since become the broad and spacious Michigan Avenue, or to realize that Indians and their teepees once squatted on the site of State and Lake Streets. In 1836 Lake Street was the main business thoroughfare of the city. In 1852 Potter Palmer opened a dry goods establishment on Lake Street. This same store was sold to Marshall Field and Levi Z. Leiter in 1862. It was not until after the close of the Civil War that the splendor of State Street as a retail avenue began to dawn. It was Potter Palmer who realized the coming importance of this thoroughfare. He set about widening the roadway for one mile and then erected a group of buildings along the new retail avenue which he rented for retail purposes. To-day it is lined with world renowned department stores. At night it is "a great white way", brilliantly lighted by a system of street lighting which "turns night into day."

East of State Street stretches the famed Michigan Avenue. From Randolph Street to Roosevelt Road, on the east lies Grant Park, an area which has been greatly increased by "made land," and its beauty added to by added shrubbery, trees, gardens and drives. Here too is situated Buckingham Fountain. The Outer Drive, which is properly Leif Erickson Drive, stretching along the lake shore from Monroe Street south to Jackson Park, and connecting with South Shore Drive at 67th Street, affords a pleasant and beautiful drive along Lake Michigan. South of Roosevelt Road, Michigan Avenue extends past "automobile row", and down through the south side of Chicago. To the north on this broad avenue one approaches Wacker Drive, that broad thoroughfare named in honor of the chairman of the Chicago Plan Commission, Charles Wacker. Over the Chicago River extends the double-deck boulevard bridge which was completed in 1926. At the lower level of the bridge ships dock and heavy commercial traffic passes freely back and forth. On its upper level a steady stream of automobiles speed on with perfect ease. North of the Michigan Avenue bridge this thoroughfare is lined with towering edifices, the Medinah Athletic Club, the Wrigley Building, the Tribune Tower, the Palmolive Building, the Fourth Presbyterian Church, and the Drake Hotel. Farther north the avenue becomes Sheridan Road, lined with beautiful residences through Chicago's "Gold Coast," and a broad expanse of park and beach. This city is famous the world over for its magnificent boulevard system. Boulevards wind through parks and lagoons and along the shores of Lake Michigan. Much of this roadway is situated upon land which has been made by filling in the lake. Chicago in 1930 had a total of 226.96 miles of boulevard.

Other important thoroughfares include Clark Street, Broadway, Randolph, Adams, Madison, Lake, La Salle, and Dearborn Streets, all business streets. The longest street in the city is Western Avenue which extends from the city limits on the north to those on the south. The shortest street is Armstrong Street which is eighty-two feet long and is situated just south of Chicago Avenue extending west of Michigan Avenue. There are 3,490 miles of street in the city, 2,550 miles of which are paved.

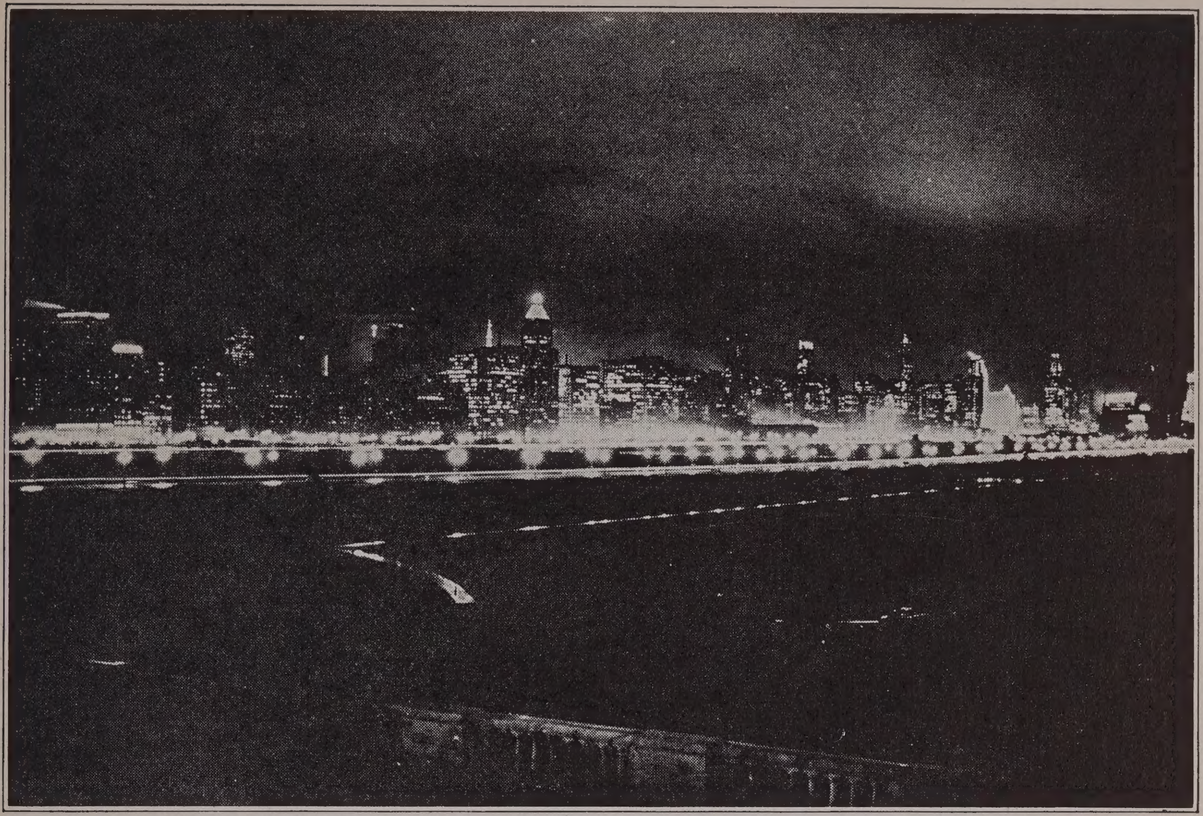
Transportation. It was in early November, 1858, that Chicago realized the completion of one important step towards improved transportation. On November 1 of that year, rails were laid along a two block stretch on State Street near Randolph and the "horse-car" made its appearance. In the following year the system was incorporated as the "Chicago City Railway Company." The "horse-car" was a picturesque sight, particularly in the winter months when the floors of the cars were strewn with straw to provide some warmth for the passengers. It was not until 1880 that this means of transportation was improved upon. It was then that the cable car appeared. The younger generation of to-day may regard the cable car as a poor and unreliable means of transportation, but to those early settlers in the 1880's, it was a dream come true as it "raced" along its line from eight to fourteen miles per hour. The picture to-day among the constant hurry and flutter which is so characteristic of Chicago, is, however, totally changed.

The inhabitants of the "Windy City" and the thousands to whom Chicago is host each year find well developed transportation facilities at every turn. In addition to the elevated railways and street cars, there are buses, taxis, suburban electric railways, air and water transportation and miles of boulevard for those who favor automobile driving. There are more than 227 miles of elevated railway lines radiating from *The Loop* area, over which 1,850 cars travel. It has been estimated that approximately 240,000,000 passengers are carried annually on these lines. There are 1,080 miles of street railway over which 3,639 street cars travel. Approximately 882,000,000 passengers are served by this means of transportation annually. The Chicago Motor Coach Company operates buses on thirty-four routes in the city, vehicles which travel over 135 miles of the city daily. This company has 434 double-deck vehicles in operation. At least fifteen motor bus lines operate out of Chicago from coast to coast.

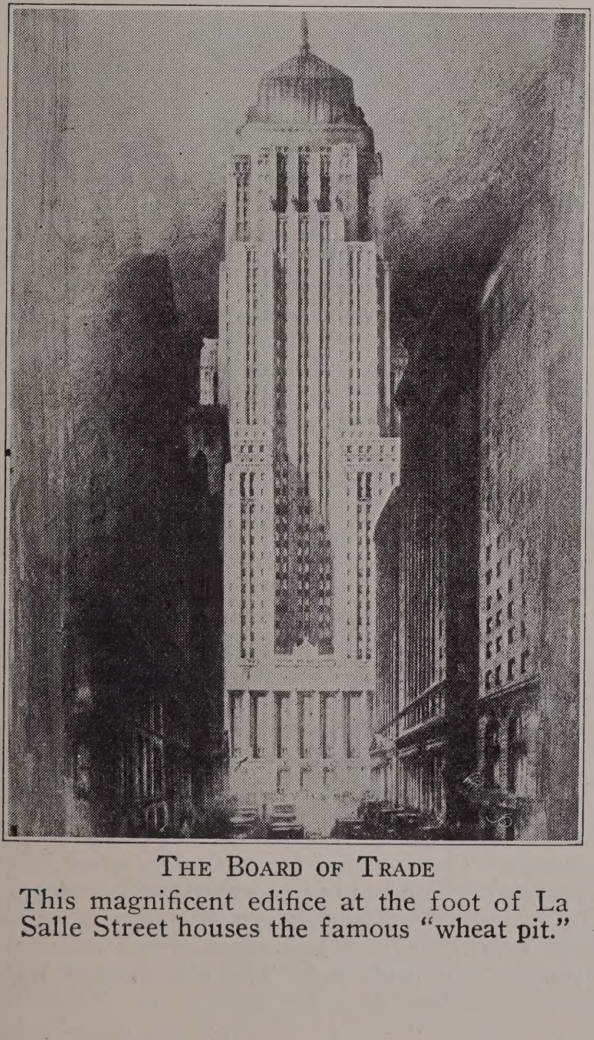
Chicago is the largest railway center in the world. It serves as a terminal for thirty-eight railways (twenty-three of which are trunk lines) and five electric lines. There are 214 railroad yards in the city which have a daily capacity of 210,000 cars. Private side-tracks serve 4,501 industries. Freight is received at 255 stations. It has been estimated that the average daily handling of freight cars is 34,800. Within a period of twenty-four hours at least 2,050 passenger trains and 380,000 passengers enter or leave the city.

The congested downtown district is served by sixty-one miles of freight tunnels which operate electric trains connecting railways, factories, and retail stores.

A well-equipped airport, the Municipal Airport, is maintained at 63rd Street and Cicero Avenue, which provides excellent airline service. The field was opened in 1927. It is operated by the Department of Public Works, bureau of parks, recreation and aviation. The airport is excellently equipped with beacons, floodlights, field and hazard lights, all of which are especially beneficial to night flying. All planes in the vicinity of the airport are controlled by means of visual signals and radio. There are sixteen modern brick construction hangars, with a capacity of about 300 planes, and a terminal building. The cost of construction totalled approximately $10,000,000. The airport covers an area of 640 acres, 360 acres of which have been developed. Thirty-six mail, passenger and freight planes leave Chicago



A Night View of Chicago's Famous Sky Line



The Board of Trade

This magnificent edifice at the foot of La Salle Street houses the famous "wheat pit."

North Michigan Avenue

The Wrigley Building, Medinah Michigan Avenue Club, and the Tribune Tower.

daily. The Chicago Plan Commission is at present envisioning two other airports for the city. One is planned for Grant Park, the other will be situated on the city's north side near Lincoln Park.

Bridges. The Chicago Bridge system has been greatly developed since 1829 when the first ferry was put into operation on the present site of the Lake Street Bridge. A foot bridge was constructed over the north branch of the river at Kinzie Street in 1832. The first drawbridge was built over the main branch of the river at Dearborn Street in 1834. The first bridge built at the expense of the city, however, was not constructed until 1857. This was the bridge over the south branch at Madison Street. Seventy-seven years later, in 1934, Chicago has fifty-seven movable bridges, fifty-two of which are operated by electricity. Three movable bridges are operated by gasoline engines and two have no power equipment. Thirty-seven of these movable bridges are modern bascule structures. Ten viaducts are owned and maintained by the city.

Buckingham Fountain. In a 600 foot garden in Grant Park at the foot of Congress Street stands Buckingham Memorial Fountain, the gift of Miss Kate Buckingham of this city in memory of her brother, Clarence Buckingham, former trustee and benefactor of the Art Institute. The fountain is twice as large as that of Latone at Versailles and cost more than $1,000,000. Three basins rise in a central pool, surrounded by four minor pools. The main pool of the center fountain measures 300 feet in diameter. Approximately 5,500 gallons of water a minute flow when the fountain is in full operation. One of the most attractive and colorful features of the fountain is the automatic lighting system which is put into play at night. Continuous color changes, using five basic colors, with no duplication of the color scheme during the evening display, are startlingly effected.

Buildings. Many imposing structures make up Chicago's famous skyline. At Chicago and Michigan Avenues stands the stately Chicago waterworks upon which construction was begun in 1852. Directly across the street stands the Chicago Avenue pumping station which was built in 1854. Although no longer in use these two stone structures still stand as landmarks in Chicago's history. Like the towers of feudal castles they stand illuminated by a warm and friendly red glow at night, presenting a picture never to be forgotten by Chicagoans and admired by its millions of visitors. Looking north on Michigan Avenue the Palmolive Building, from which the powerful Lindbergh Beacon pours its gleaming light to guide aviators, attracts and holds the eye. The stately grey spires of the Fourth Presbyterian Church with its cool cloister adds beauty to the busy thoroughfare. Farther south rise the Tribune Tower, the Medinah Athletic Club, a 487 foot structure of forty-two stories, and the famous Wrigley Towers. On Wacker Drive stands Mather Tower, 562 feet high, a forty-one story building. In downtown Chicago is situated the city's tallest structure. On Jackson Boulevard at LaSalle Street stands the Chicago Board of Trade, a forty-four story structure, soaring skyward 609 feet. Among the city's other important buildings in the downtown districts are the Pittsfield Building, 557 feet high and consisting of forty-five stories; the First Methodist Episcopal Church, 556 feet high; No. 1 North La Salle Street, 531 feet high, and the Steuben Club which has a height of 475 feet. The new Chicago Postoffice was opened in November, 1933. The Bedford stone structure, erected at a cost of $22,000,000, extends from Harrison to Van Buren Street and from Canal Street to the river. It has a flat roof, 790 by 270 feet, which is designed as an airplane landing field.

On Michigan Avenue at Adams Street stands the Art Institute, an imposing edifice of Modern Renaissance architecture. It was opened to the public in 1893. The original charter of the museum was amended on December 1, 1925. In addition to its exceptionally fine collection of paintings of both the old masters and modern painters, sculpture and other art collections, a school is maintained by the Art Institute which offers courses of training in sculpture, design, painting, interior decoration and other artistic pursuits. The International Art Exhibition of a "Century of Progress" was assembled here. In close proximity to the Art Institute and connected with it is the famous Goodman Memorial Theatre.

Grant Park has several interesting buildings. Shedd Aquarium was opened to the public on June 1, 1930. Its construction was made possible by a $3,000,000 fund created by John G. Shedd, a prominent Chicago merchant. It is an octagonal structure with a foundation measuring 300 feet in diameter. The top of the dome from the foundation line measures 100 feet. Much of the structure lies below the level of Grant Park. The building contains 132 exhibition tanks. There are between 6,000 and 7,000 salt and fresh water fish in the aquarium representing approximately 700 species. Two main reservoirs, with a capacity of 1,000,000 gallons each, supply the water in the exhibition tanks.

The first planetarium to be established in America was Adler Planetarium in Grant Park, Chicago. It is situated on an island just east of Shedd Aquarium. The structure was given to the city by Max Adler. The cost of its construction totalled $1,000,000. The edifice is 160 feet in diameter at its foundation. It is a twelve sided structure, each side bearing a sign of the zodiac. The Minnesota granite lower structure has a copper dome eighty-five feet in diameter. The top of the dome is eighty-five feet above the level of the terrace upon which the building stands. The interior of the dome is of steel network which has been sprayed with concrete. This concrete filling is covered with a white cloth forming a screen upon which celestial images are projected. The planetarium was dedicated on May 10, 1930. The technical director of the institution is Dr. Philip Fox.

The Field Museum of Natural History, established in 1893, was originally located in Grant Park. The new building which was opened on May 21, 1921, is situated in Grant Park, just southwest of the Shedd Aquarium. The edifice, of four stories and a clerestory, is of Greek Ionic architecture, constructed of Georgia white marble. The building, which measures 700 feet by 300 feet in the interior, extends over about eleven acres of ground. Within its thirty-six exhibition halls are represented the departments of anthropology, botany, geology and zoölogy.

The Rosenwald Museum of Science and Industry is situated in Jackson Park on the South Side of Chicago. The edifice is the restored Fine Arts building of the Columbian Exposition of 1893. The establishment of the museum was made possible by funds provided by the late Julius Rosenwald of Chicago. Indiana limestone was used to replace the plaster exterior of the structure of Classical architecture. The interior has been completely redesigned. The museum was opened to the public on July 1, 1933. Many industrial and scientific exhibits were displayed here in connection with the "Century of Progress" exposition of 1934, although the museum itself had no direct connection with that exposition.

Chicago's libraries are housed in beautiful structures in all sections of the city. The Chicago Public Library, situated at Michigan Avenue and Washington Street, is a free public institution. In 1932 it contained 1,687,288 volumes and maintained forty-five branch libraries. The John Crerar Library, located on East Randolph Street at Michigan Avenue, is purely a reference library. In 1933 it contained 575,000 volumes and 300,000 pamphlets. The Newberry Library is an imposing granite structure situated on North Clark Street and Walton Place. It contains 493,549 books and pamphlets for reference use only. The "grey towers" of Harper Memorial Library on the University of Chicago campus on the Midway, rising majestically skyward, have oftentimes been referred to in poetry and prose. This, together with the departmental libraries on the campus, contains 1,050,482 volumes. Many smaller libraries are maintained throughout the city.

Chicagoland is well known for its spacious motion picture theatres, beautiful hotels, friendly homes, and myriad clubs, all excellent examples of well planned construction.

Churches. There are more than 1,700 churches in the city, 1,174 of which are Protestant with a membership of 429,265. Catholic churches number 255 with a total membership of 1,159,390. An archdiocese of both the Roman Catholic and the Episcopal Church are situated here. In 1926 the Eucharistic Congress, held in Chicago, was attended by eight European Cardinals and about one million pilgrims. There are twenty-one Christian Science churches in the city and one hundred Jewish synagogues.

The World Parliament of Religions, held at the Columbian Exposition of 1893, had as its motto, "Ye shall know the Truth and the Truth shall make you free." At the "Century of Progress" exposition of 1934, was held the World Fellowship of Faiths. Its motto was "To unite the best inspiration available from ALL FAITHS upon the solution of MAN'S PRESENT PROBLEMS." The Hall of Religion at the "Century of Progress" represented all creeds.

A few of the most outstanding churches in the city, from an architectural viewpoint, are Holy Name Cathedral, Fourth Presbyterian Church, St. James and St. Chrysostom's, both Episcopal churches, and the First Methodist Church.

Parks. Park administration in Chicago has been developed beyond that of any city in the United States or any other country. A forest preserve district, composed of the entire county of Cook, is under the control of the county board. All of the parks in Chicago have recently been consolidated into one park district and are under the control of a single board of commissioners. Chicago's park area on January 1, 1930, totalled 7,327 acres.

Lincoln Park is the largest of Chicago's parks. It originally extended from North Avenue on the south to Diversey Parkway on the north, along the lake shore, covering an area of 323 square miles. In recent years, however, 453 acres north of Diversey Parkway, including a fifty-seven acre Yacht harbor, have been added to the park area, which now extends north to Foster Avenue. A zoölogical garden is situated in Lincoln Park, an aquarium, an Academy of Natural Science, and the new building of the Chicago Historical Society.

Among the city's south parks are Jackson Park of 543 acres which extends along the shores of Lake Michigan. It was here that the World's Fair of 1893 was held. Jackson Park is well equipped with recreational facilities. The broad and beautiful Midway Plaisance, a boulevard 660 feet wide, connects Jackson Park with Washington Park. The latter extends over 371 acres of ground. The majority of parks in the city are connected by magnificent boulevards. Farther south lies Marquette Park (322 acres). On the West side the larger parks are Humboldt (206 acres), Garfield (188 acres), and Douglas (182 acres). Adjacent to Humboldt Park at its southern extremity is situated the Humboldt Park Natatorium and Playground which was acquired in 1912 extending over 1,057 acres. Garfield Park contains the largest conservatory in America. In addition to the city's large parks, many small parks and playgrounds are maintained, in districts where the need for park facilities is greatest.

In the spring of 1934 a new Zoölogical Park was opened in the Cook County forest preserve at Brookfield. The park, the development of which is in charge of the Zoölogical Society, extends over 172 acres.

Education. In 1933 the Board of Education deemed it wise and necessary to effect changes in the Public School System of the City to reduce operating costs. Junior high schools were abolished and the buildings used for elementary and high school purposes. Crane Junior College was temporarily closed. School curriculum was altered by the temporary abandonment of elementary physical education, manual training and household arts. More than one thousand teachers were removed from the pay rolls. To conform with the reorganization of the school system thirty new high school districts were created. Eleven of the junior high schools were converted into senior high schools and eighteen became elementary schools. In September, 1933, there were 477,196 pupils enrolled in the Chicago public schools. There were 12,539 teachers. There are thirty-five high schools in the city, four of which are technical schools. The city also maintains a normal college for the training of public school teachers. There are several well-known institutions of higher learning situated here, the most important of which is the University of Chicago. Northwestern University in Evanston maintains its colleges of Commerce, Dentistry, Law and Medicine in Chicago. These schools are situated on McKinlock Campus on Lake Shore Drive. Among other important colleges are Armour Institute of Technology, Lewis Institute, Loyola University, Mundelein College, and numerous schools of music and acodemies. Plans were under way in 1934 to open three junior colleges in the city in the autumn.

Commerce and Industry. Chicago is the great central market of America and it is because of its advantageous position in a great productive region that its commercial and industrial development has been so rapid and far reaching. Excellent transportation facilities, both rail and water, have been of wide importance to the development of industry. One of the city's most important industries is that of live stock and packing. Chicago's Stock Yards was organized in 1864 as the Union Stock Yards. It originally extended over 320 acres of land and consisted of 2,200 pens. In 1886 there were 4,200 pens connected by over thirty miles of streets and alleys with loading and unloading chutes to all railways entering the city. Packing houses abounded about the yards district. In the 1880's there were twenty-nine large packing houses, chief among which were those of Philip D. Armour, Swift and Company, Cudahy Packing Company, and Oscar Mayer. To-day these yards extend from 39th to 43rd streets, 472 acres, and have become internationally famous. On May 19, 1934, the Union Stock Yards were partially destroyed by fire. Through the continual efforts of 2,200 firemen, the devastating flames were confined to an area of eight city blocks. The direct cause of the fire remains unknown. Days preceding the fire had been hot and dry. High winds merely fanned the flames into greater ferocity and swept the wooden structures of the yards up in their path. One death and no critical injuries were reported from the scene. Reconstruction work was immediately begun. Brick and concrete fireproof buildings were to be constructed in accordance with fire prevention laws of the city. Eighty per cent of the damage was covered by insurance. Twenty per cent will be borne by property owners.

Chicago is also one of the leading manufacturing cities of the country. The last census revealed a total of 10,540 manufacturing establishments in the city. The principal manufactures are agricultural implements, foundry and machine shop products, and clothing. The International Harvester Company is situated here. Other important industries are printing, publishing, iron and steel and the manufacture of household, electrical and gas devices, telephone equipment, and furniture.

The commercial importance of Chicago is limitless. Its lumber and grain markets are internationally important. A greater variety of raw materials and manufactured products are sold here than in any other city in the world. The largest municipal lighting system in the world is in operation in Chicago.

Government. In accordance wth the Act of Legislature in 1875, Chicago is governed by a Council, a unicameral body with fifty elected aldermen. Since 1907 the Mayor of the City serves a four-year term, and in his official capacity presides at the meetings of the Council which are held weekly. There are various departments, bureaus and boards to which certain powers are delegated. The water-works, an extensive system of tunnels, cribs and pumping stations, is owned and operated by the city. It was for the purpose of purifying the city's water supply that the Chicago Drainage Canal, completed in 1900, was built. Sewage is carried by the Canal to the Kankakee River at Joliet and thence to the Mississippi.

Population. In 1930 Chicago had a population of 3,376,438. Approximately 70,000 are added to the city's population annually. The center of population is Hull House at the southwest corner of Polk and Halsted streets. Hull House, world famed social settlement, was founded by Jane Addams in 1889 at 800 South Halsted Street. Classes are held here in language, painting, sewing, wood-carving, manual training, cooking and business. Children's clubs and numerous recreational facilities are offered thousands of eager humans who literally hunger for some interesting way to pass leisure time. There are 842,057 persons of foreign birth in Chicago, many of whom have found a haven in Hull House. The native white population totals 2,275,674. Chicago is the sixth largest German city in the world and the second largest Bohemian, Norwegian, Swedish, and Polish city. The city's birth rate had decreased from 19.8 in 1926 to 14 in 1932. Its lowest death rate, 9.75 was attained in 1932.

History. In December, 1674, when Pére Marquette was guided to the Chicago River by the Pottawattomie Indians, the plain was no more than six feet above sea level—a dreary, frozen marsh. It was bounded by a wooded ridge ten miles back, the old shoreline, and relieved only by two low elevations of glacial drift—Stony Island (gravel) and Blue Island (clay). The saintly Jesuit, on his way to found a mission among the Indians, was conducted along the route that had long been used by the many Algonquin tribes of the upper lakes and the middle Mississippi. Pére Marquette passed the winter at the Chicago portage in a small cabin on the south branch of the river. In the following early spring he died while attempting to reach Mackinac by the eastern shore of Lake Michigan.

Although the French are believed to have maintained a fort at the Chicago portage about 1718, it was not until a Negro, Jean Baptiste Point de Saible from San Domingo, settled here as an Indian trader, in 1777, that a real settlement was made. He sold his house built of squared logs to a French trader in 1796. It was this same house that John Kinzie, an Indian trader, bought in 1803, and which later became known as the "old Kinzie mansion." On the north bank of the river, in this old log house, in 1804 was born the first white child in this region. John Kinzie died in 1828, but his old house stood opposite Fort Dearborn until 1837.

In 1804 Fort Dearborn was built, a mere stockade with two blockhouses, on the south bank of the Chicago River. A tablet marks the site of the fort to-day. It was not until the close of the War of 1812 that the fort showed any signs of growth. That horrid massacre of August 15, 1812, was a harrowing experience. Indians whooped down upon the fort, burned it to the ground, and slaughtered men, women and children. In 1816 Fort Dearborn was reconstructed and a small village sprang up about the fort. The first school was opened in this same year at Pine Street and Michigan Avenue. Peace with the red man, however, did not follow for almost twenty years. After the Black Hawk War in 1831, the Indians of northern Illinois were removed to Iowa, and the vast region of fertile prairie behind Chicago was open to settlement. The settlement grew rapidly and in 1833 the town was incorporated with a population of 4,497. In 1848 it had grown to 20,000. For the first time in history four-story structures were hoisted on jackscrews twelve and fourteen feet without interrupting business, to raise the city's level. The sand-bar that turned the river a half mile south to seek an outlet was used to raise the grade of the streets. The river was cut straight out to the lake. The channel and harbor were deepened. Pumping works on the south branch of the river reversed the current. In 1901 the Drainage Canal was opened, one of the world's greatest sanitary works, fifteen miles of which were cut through solid rock.

The lesson of wide streets and substantial buildings Chicago had to learn through the most disastrous fire recorded in history. On the evening of October 8, 1871, in a certain O'Leary barn at nine P.M., a fire started. Fierce flames and dangerous sparks, fanned by a strong southwest gale, consumed homes, and stables, swept over the bridge and across the river to the northern division of the city and the finest residence section. More than three and a third square miles were burned over, 17,450 buildings were destroyed and 100,000 people were made homeless. All night the fire raged, leaving in its fiendish wake a mass of charred ruins.

Within a year the city had sprung from its ashes. Its courage, energy and resource amazed an admiring world. The rise has been steady until to-day Chicago has become one of the most important cities in the world. A celebration of the one-hundredth anniversary of the founding of the city was held in 1933. The exposition was designated as a "Century of Progress." The exposition was reopened on May 26th, 1934.

See Canal; Century of Progress; Moody Mission; Theological Seminary; University of Chicago; World's Fair.

Chickadee (*chĭk'ȧ-dē*), a modest, little, soft-plumaged gray bird, is a member of the titmouse family. The black-capped chickadee is a permanent resident of the northern states. Its breeding-range is north of the Carolinas to Labrador. It is somewhat smaller than the English sparrow, the upper gray slightly tinged with brown, crown and throat black, with white separating the two blacks; underneath a dingy white. It is a brave little bird, quite unafraid of snow and storm, more common in lower New England in winter than in summer, through wintry weather blithely singing its *chicka-dee-dee-dee-dee* or uttering its high, sweet whistle; and a friendly, tame bird, readily responding to invitation to dine near our windows and doors. It is a valuable friend to man in many ways; as an insect-destroyer it is most diligent, a persistent enemy of the cankerworm moth, destroying both the female and eggs and thus keeping down the numbers of "measuring" or "inch" worms. It eats insects in summer, their eggs in winter. Hodge says that probably no bird possesses a higher economic value than the chickadee. The birds build their nests in holes—a deserted woodpecker's nest, or a knothole or a cavity made by themselves in some decayed tree. The nests are of moss, feathers, wool, plant-fibre, fur or sometimes wholly of short hairs. There are from five to eight eggs, white with sparse markings of purple or brown.

The Carolina chickadee is a southern species, the chief difference from the above being that the southern bird is smaller, its breeding-range from southern Illinois southward. See Dugmore: *Bird Homes;* Chapman: *Bird Life;* Blanchan: *Bird Neighbors;* Hodge: *Nature Study and Life.*

Chickahominy (*chĭk'ȧ-hŏm'-inĭ*), a river in southeast Virginia, which flows into the James. Part of the region watered by the river was the scene of several battles in 1862 and 1864. Here the river flows through a wooded swamp, a few hundred yards wide. A continuous rainfall floods the swamp and overflows the neighboring bottom-lands. These are crossed by deep ditches, and even when not overflowed are so soft as to be impassable for cavalry and artillery. As a military obstacle, the narrow Chickahominy, with its bordering swamps, was found to be more formidable than a broad river. Here in 1862 were fought the battles of Williamsburg, Hanover Court-House, Seven Pines, Fair Oaks, Mechanicsville, Cold Harbor, Savage's Station, Frazier's Farm and Malvern Hill, and in 1864 the second battle of Cold Harbor was fought.

Chickamauga (*chĭk'ä-ma̤'gȧ*), **Battle of,** fought upon Chickamauga Creek, a branch of Tennessee River, between the Union Army of the Cumberland under General Rosecrans and the Confederates under General Bragg, Sept. 19 and 20, 1863. The main battle was opened on the morning of the 19th, the Confederates endeavoring to get possession of the road to Chattanooga. Neither side gained any advantage on the first day, though the fighting was severe. During the night Longstreet joined Bragg. On the 20th the Confederates renewed the attack with great fury. At length, in an effort to strengthen the left, which was hard pressed, and partly through a mistaken order, the Union center was fatally weakened. Longstreet with his veterans charged through the line and drove the right wing in confusion from the field. But Thomas, who was on the left, remained firm and repulsed charge after charge made against him by the whole Confederate army. During the night he withdrew to Rossville Gap. This was a Confederate victory, though of no great advantage to them, as it left Chattanooga, the objective point, in the hands of the Federals. The Union loss was about 16,000; Confederate loss about 18,000.

Chickasaw Bluffs (*chĭk'ȧ-sa̤*), **Battle of,** was fought near Vicksburg, Miss., Dec. 29, 1862. General Sherman, who was besieging Vicksburg, endeavored to attack the city in the rear. He sent a strong force up Yazoo River, which was to land and march down from the north. In the line of the march was the Chickasaw bayou, bordered by a broad, miry swamp, almost impassable, and guarded by batteries and rifle-pits on the opposite bluffs. Though the head of the charging column reached the works, the heavy fire forced it back and the enterprise was abandoned. The Union loss was about 1,900, while the Confederate loss was very small.

Chickasaws, a tribe of Indians, found by the whites about 160 miles east of the Mississippi. De Soto visited them, but when he sought to force them to carry his baggage, they attacked him, causing great loss. In the French-and-Indian wars, the Chickasaws were between the English and the French settlements, and thus came into the struggle between the two nations. They uniformly sided with the English, stirring up the Natchez against the French, and, when that tribe was almost destroyed, joining them in their desperate raids. In 1793 they joined the whites in the war against the Creeks. In the Civil War they joined the south and lost many of their braves. When they became citizens of Oklahoma and the United States, their tribal government was abandoned, and they took part in the elections of the "white man."

Chickasha, a city, county-seat of Grady County, Oklahoma. It is the trading-center of a fine agricultural region and an important shipping-point for cotton. Chickasha has a flour-mill, a broom-factory and cotton-gins, and the Rock Island car-shops and round-house are located here. It has four banks, good public schools, a convent, library and several churches; also the service of two railroads. Population, 10,320.

Chicken-pox, a contagious but rarely dangerous disease which usually begins with a slight fever, restlessness, and pains in back and legs, followed in a day or so by a red eruption not unlike smallpox, which appears on the face and spreads downward, new areas of eruptions appearing while the older are disappearing. A fluid forms in the pimples within a day or so. Three or four days later a crust forms, which scales off. Permanent pox marks will not result if the pimples and crusts are not scratched. Bathe the afflicted person with some solution which will relieve itching and keep the crust formations oiled.

Chic'opee, Mass., a thriving manufacturing town on the Connecticut River, at the mouth of the Chicopee, four miles north of Springfield, Hampden County, Mass. It possesses excellent water-power for its industrial establishments, which include the manufacture of cotton, knitted goods, knitting machines, bicycles, rifles, shotguns, pistols, mechanic's tools and agricultural implements. It has a number of good schools, churches and a convent, with several substantial banks. Chicopee Falls are in the neighborhood. Population, 42,000.

Chignecto Bay (*shig-nĕk-tó*), an inlet at the north end of the Bay of Fundy. It separates Nova Scotia from New Brunswick. It is 30 miles long by eight miles in breadth. There is an isthmus only 14 miles wide between it and Northumberland Strait in the Gulf of St. Lawrence.

Chi-hoang-ti, one of the greatest emperors of China, who ruled from 246 to 210 B. C. It was he who, by his military successes, formed the eight kingdoms then making up China into one great empire. He further extended the empire so that under him it came to be about as large as it is now. He was also the builder of the great Chinese wall.

Chihuahua (*chē-wä'wä*), the largest state of Mexico, adjoining New Mexico and Texas, covers 90,036 square miles and is about as large as Idaho. In the east is a large desert of sand; the south and west are mountainous; and there are many rivers. Its silver mines were for centuries the richest in Mexico. Its capital, Chihuahua, rises like an oasis in the desert among roses and orange-groves. Founded in 1691 it housed a hundred years ago 80,000 people. The population of the state is 491,893.

Child, Lydia Maria, American author and, with Wm. Lloyd Garrison, a zealous advocate of slavery abolition, was born at Medford, Mass., Feb. 11, 1802, and died at Wayland, Mass., Oct. 20, 1880. Early in the thirties, some few years after her marriage, she and her husband (David Lee Child) took an active interest in the subject of American slavery, against which she made many stirring appeals, both in her novels and in a periodical which she afterward edited, the *National Anti-Slavery Standard.* Her writings greatly contributed to the formation of public opinion adverse to the holding of slaves; while she aided the cause she had at heart by supporting schools for the negroes, helping freedmen and giving of her bounty to the Union soldiers in the Civil War. Her writings include *The Rebels;* a novel, *Hobomok; Fact and Fiction; The American Frugal Housewife; Looking Toward Sunset* and *The Progress of Religious Ideas.*

Child Labor, the employment of children in gainful occupation. So long as a young apprentice lived in the family of his master, the evils of child labor do not appear to have been great. When, however, at the end of the eighteenth century and the early part of the nineteenth century, children came to be employed in large factories, at a very early age, for very long hours and under a brutal discipline and most unhealthful conditions of work, laws become needful to restrict the abuse of child labor. Both the need and the laws came earlier in England than in the United States. Probably no man did so much on behalf of the factory-acts as did Lord Shaftesbury. In 1802 the hours of apprentices were limited to twelve, no part of which must fall between nine P.M. and six A.M. In 1819 was passed an act that no children under nine years should be employed in the cotton mills nor should their hours be more than twelve per day. In 1899 the Elementary Education Act raised the age at which a child might leave school from eleven to twelve years. An act of 1901 summed up the results of the factory-acts and allowed no children under the age of twelve to be employed in factories.

In 1930 there was passed in Great Britain a measure declaring it illegal to send young folks under eighteen abroad for the purpose of appearing in theatricals. Most of the countries of to-day have regulations which prohibit child labor under fourteen years of age.

The most important legislation in the history of child labor was the act passed by the Congress of the United States in 1916, excluding from inter-state commerce, articles from factories where any child under fourteen years of age is employed or where any child under fifteen has worked more than eight hours a day or been employed at night. In 1918, however, the United States Supreme Court—although by a majority of only one—declared the law unconstitutional on the ground that the regulation of child labor is a purely internal affair of the state and therefore not within the jurisdiction of Congress. The same decision was made by an Act of 1919 signed by President Wilson. Child labor laws were thus left in the hands of the states.

In 1924 Congress proposed the following Child Labor Amendment:

"Section 1. The Congress shall have power to limit, regulate, and prohibit the labor of persons under eighteen years of age.

"Section 2. The power of the several States is unimpaired by this article except that the operation of State laws shall be suspended to the extent necessary to give effect to legislation enacted by Congress."

The amendment was ratified by five states, Iowa, West Virginia, Minnesota, Maine and Pennsylvania in December, 1933. The renewed interest in the amendment is due in large part to the NRA, the industrial codes of which prohibit child labor in major industries. The amendment had previously been ratified by Arizona, Arkansas, Colorado, California, Montana, Wisconsin, Illinois, Michigan, New Hampshire, New Jersey, North Dakota, Ohio, Oklahoma, Oregon, and Washington.

See Factory, and Factory Legislation; National Recovery Administration.

Child-Study. Early philosophers and psychologists, notably Plato and Aristotle, have occasionally commented on phases of child-life, but the systematic study of the mental and physical nature of children has been reserved for modern and, indeed, quite recent times. The subject was first approached from the point of view of the educator. Among many others Comenius, Rousseau and Pestalozzi were strenuous in insisting on the vital importance of a study of children to the one who expects to teach them. All these writers emphasized the need of beginning education with an appeal to the senses. Only in this way, they declare, can the reason and the judgment ultimately be reached. Rousseau, the enthusiastic advocate of nature, was especially interested in the child, at any rate in the theoretical child, as one expressing the purely natural in its naïve spontaneity. He would have the education of the child consist largely in permitting it to develop in a natural and untrammeled way. This idea, antagonistic to the earlier religious one of the total depravity of the child, was, in spite of some limitations, the inspiration of the greater part of modern educational reform.

Herbart, whose educational theory turns about the notion of apperception (q. v.), requires of a teacher a very careful study of the contents of the child's mind and also of those diseases, temperamental variations and emotions that are likely to interfere with successful learning. It will be noticed that he does not advocate child-study as a means of discovering those instincts, the proper development of which constitutes the aim of education. This point of view, suggested by Rousseau, it was left to Froebel and more recent students of children to develop. On the other hand, Herbart did point out the great importance of studying the minds of children and of men by observation and experiment instead of by introspection and speculation. This improvement in method has been responsible for a large part of the results of recent child-study.

Froebel derived his view of the aim and material of education from his sympathetic philosophy of the nature of the child. From the point of view of the development of child-study, his most interesting conception is that the child in his evolution passes through or recapitulates the same series of steps that has been traversed by the race in its evolution. This idea was not original with him but was derived on the one hand from philosophers like Lessing, who were emphasizing, as against Rousseau, the value of historic culture to the individual, and on the other from biologists like Von Baer, who had discovered that the embryo of any higher type of animal passes through stages in which it resembles the embryos of lower types down to the very simplest. This notion of recapitulation has been applied to education in two forms. The first is that of the culture-epoch theory, developed by Ziller, one of the followers of Herbart. According to this view the course of study should be so arranged that the child will first take up the study of primitive life and culture, and then deal successively with more and more advanced types of civilization. Courses of study arranged on this plan were expected to appeal most successfully to the interests and powers of the child. This contention has not been entirely justified, but the culture-epoch theory remains to-day a most valuable clue to the interests of children. The second application of the theory of recapitulation to education is found in the notion that the various instincts appear in the child in much the same order that they appeared in the race. At first very imperfectly developed, they require education for their perfecting, but the satisfactory maturation of the child requires that each should be allowed to run its course, so that the properly developed child has run the gamut of ancestral interests. This idea may be said to represent fairly well the belief of the very influential group of child-psychologists who follow President G. Stanley Hall of Clark University.

The method of careful scientific observation of the child recommended by Herbart finds its earliest and best exponent in the German physician and psychologist, Preyer. In his book, *The Soul of the Child,* we find a most careful study of the development of the powers of sense, or the feelings of physical and mental control, of language and the logical processes and self-consciousness. Space does not permit the statement of detailed conclusions, but the most suggestive and interesting outcome of Preyer's investigation is the clearness with which he puts the fact that the child at birth and for many months thereafter is not only without self-consciousness, reason and will, but that even its sense-perceptions are vague, confused and undifferentiated. Feeling is at first the mere rude sense of discomfort or comfort. The eyes are uncoördinated, the gaze is not fixed, and objects are not clearly discerned, not to speak of distances and colors. The same general condition holds of hearing and touch and even taste and smell.

The clarifying discoveries of Preyer have stimulated much valuable research into the methods by which self-control, judgment and conscience are evolved from the primitive chaos and night of the infant's consciousness. The most important development in this field takes the form of a psychological reinterpretation of the old principle that learning should be by doing. As stated by the American psychologists, Professors Dewey and Angell, who merely represent here the point of view of the psychology of to-day, consciousness arises when the child is stimulated more or less uncomfortably by some object, say a rattle. It reacts in a variety of movements, partly reflex, partly random in character. Among these movements one is usually more satisfactory in its results than the rest. Assume it to be that of grasping the rattle. This comes in the course of time to be the one movement that follows from the given stimulus, and the other unsuccessful movements are gradually eliminated. While this process is going on, the mind is gradually growing familiar with the stimulating object and is distinguishing those characteristics by which it can be identified. Thus perception is developing. The child becomes conscious of what the object is and what it means. It then is capable of acting toward this object with intelligent foresight into consequences that is, it can will. In a similar way all the mental powers develop. We learn to perceive, to remember, to imagine and to reason because we react toward stimulating objects, and in order that we may react more successfully. Consciousness finds its stimulus in an unsatisfactory situation and its function in assisting to a satisfactory treatment of this. To get a pupil to learn, the teacher must get him to be discontented with his capacity to do. This will stir up a process of experimentation, in the course of which the powers of thought and feeling will expand.

The typical experimental activity through which a young child learns most has been recognized to be that of play. According to Professor Groos, play is simply the expression of the instincts of the child and so of its interests and capacities. This activity is accordingly justified in the place assigned to it in education by Froebel. It must, however, be led into work by methods that are indicated in the article on Interest. One important activity by which this transition between the imperfect, instinctive plays of the child and mature efficiency is effected is found in imitation. This process has been exhaustively treated by the American psychologist, Professor Baldwin, who finds in it the means by which the child is led to become conscious of himself and of others, and so to develop his social and ethical nature. In the endeavor to imitate the child becomes adjusted to society.

The great emphasis thrown by child-psychologists upon the feebleness of intelligence and the imperfection of instincts in the infant naturally rouses our curiosity as to why the young of brutes should be so much more capable of helping themselves. Mr. Fiske, the American historian and philosopher, has found in the helplessness of infancy the secret of man's capacity to learn. A brute is fairly well-fixed in its mode of life by its instincts. It does well in commonplace situations, but in unusual emergencies it is helpless. Its life is, however, as a rule, simple and commonplace. It does not need to do new things. Man, on the other hand, is in his complex life continually compelled to learn to readjust himself. Hence he is born helpless, with imperfect instincts and a corresponding enormous capacity to learn.

In recent years the child psychologists have devoted much attention to the special features of the age of adolescence. This subject is treated in another article. Another important field is the study of the physical development and health of the child. Much information of the greatest value to teachers has come from these investigations.

See Adolescence; Apperception; Interest; Psychology for Teachers; Self-Activity.

Childs, George William, an American publisher, was born at Baltimore, Maryland, in 1829. He came to Philadelphia at an early age, and about 1849 became a member of a publishing firm which afterward took the title of Childs and Peterson. In 1864 he became owner of the *Public Ledger*, which he made very successful. He was well-known for his generous gifts to charitable and public causes. His philanthropy took many and varied forms. He established a home for aged printers. Other gifts were in commemoration of authors, as George Herbert and William Cowper in Westminster Abbey, and a memorial fountain to William Shakespeare at Stratford-on-Avon. He died in Philadelphia, on February 3, 1894.

Chile (*chē'lā*) or **Chili** (*chĭl'ĭ*), a republic of South America, is situated in the Pacific coastal region. The name is supposedly derived from the ancient Peruvian word meaning "snow." Chile extends from Peru to the southernmost point of the continent, with a coast line of about 2,485 miles and an average width of 100 miles. It has an area of 285,133 square miles. It is bounded by the Pacific Ocean on the west and by Bolivia and the Argentine Republic on the east, and Peru on the north.

Surface. The Andes Mountains extend in two lines, almost parallel, throughout nearly the entire length of Chile. Between these ranges lies the great central valley of rich soil, 581 miles long and thirty-one miles in average width. The average height of the Andes is 8,000 feet, and more than one-fourth of the territory of Chile lies above the snow line. There are many lofty peaks. Aconagua rises to 23,080 feet in the Chilean-Argentine boundary, and is the highest peak in the Americas. Other important peaks are Corcoputi, 22,162 feet high; El Muerto, 21,227 feet; the Baya, 19,993 feet, and Guallartiri, 19,882. There are many peaks ranging from 18,000 to 20,000 feet in height. From 1904 to 1924 there were 12,694 earthquakes, which averages two a day. In 1822 the coast was permanently lifted between three and four feet, near Valparaiso.

The land in the north is arid, and the southern soil is also poor except in the valleys, but the great central region is excellent for agriculture. Streams in the north are little more than shallow brooks, but those of the south are larger and more numerous, although most of them are navigable for a few miles only. The rivers of importance are the Maipu, which flows through the valley of Santiago; the Máule; the Biobio, which is the largest in Chile; the Cauten, or Rio Imperial; the Bueno, and the Callecalle, or Rio de Valdivia. The latter is 100 miles long, and most important of all, because of the harbor at its mouth. There are many deep lakes in the south, chief of which are the Lhauquihue, thirty miles in length, and the Rauco, thirty-two miles in length. There are many mineral waters, both saline and sulphurous. The chief spa is at Chillán. Many islands belong to Chile, the most important being those that belong to the province of Chiloé.

The country is divided into three distinct zones—the arid zone in the north, the agricultural in the center, and the forest zone in the south. The northern provinces of Tarapacá, Atacama and part of Coquimbo are rainless, almost desert regions. The Patagonian region is the densely wooded, sparsely inhabited land of virgin forest.

Climate. The seacoast on the west and the mountain range on the north provide a very healthful climate in Chile. The temperature varies from sixty-seven degrees in the north to forty-three degrees in the south. It averages about six degrees lower than the eastern coast of South America, because of the Andes, which shut off the warm winds from the eastern plains, and the Antarctic current, which flows along the western coast. The northern section is tropical, and practically rainless, due to the dry southeast trade-winds. The central section has a temperate climate and dry summers, with rainfall in winters. In the southern section rainfall is heavy, averaging 115 inches yearly.

Minerals. Chile is a land of inexhaustible mineral resources. The output is valued at two-thirds that of the entire continent. The arid section in the north is the chief source of the nation's wealth. It is here, in the *pampa salitrera* of the desert of Atacama, that for long the world's chief nitrates were found. The deposits have been estimated at more than 3,000,000,000 tons. Ninety-five per cent of the world's nitrate supply was produced in the two provinces of Tarapaca and Antofagasta, until the process of obtaining nitrate from the air became commercially profitable. In 1913, the Chilean nitrate industry furnished fifty-eight per cent of the world's demand for commercial nitrogen, but in 1929 this amount was reduced to only twenty-three per cent, due to the increasing production of synthetic nitrogen fertilizers, especially in Germany and the United States. Before the War, the export tax on nitrates alone had furnished sixty per cent of the government's total revenues. July 21, 1930, marked the one hundredth anniversary of the first shipment of nitrate, since when Chile has shipped more than 100,000,000 tons. The severe decline in demand for Chilean nitrates and in prices compelled a drastic readjustment of the industry, effected March 20, 1931. The company formed then was not successful, however, and President Alessandri by decree of January 2, 1933, dissolved it. In 1929, there were exported 2,841,900 tons of nitrates, valued at $114,876,900; in 1930, this had decreased to 1,785,723 tons valued at $71,127,062; and in 1931, there were exported only 1,454,611 tons valued at $43,654,288.

Chile is the world's second largest producer of copper, and in 1931 mined 215,696 tons, of which 211,738 were exported. Production of gold in 1931 was 16,718 ounces; of silver, 372,361 ounces. Extensive iron-ore deposits, estimated at 1,000,000,000 tons, are found in the provinces at Atacama and of Coquimbo. 712,000 tons were exported in 1931. The coal production in that same year amounted to 1,107,266 tons, with reserves which total 2,000,000,000 metric tons. The iodine output furnishes about eighty per cent of the world's supply. In 1929, about 1,400 tons were produced. Other minerals obtained are cobalt, zinc and manganese; borate, salt, guano, and about 15,500 tons of sulphur annually.

Production and Industry. Although the wealth of the country lies chiefly in its minerals, there are other important productions. In the great central section there are about 95,000,000 acres classed as arable land, but much of it lies idle. It is said that twenty per cent of this is sterile, twenty per cent forests, and fifty-three per cent cultivated and natural pastures. To promote agriculture, the government had up to 1930 made grants of over 91,000 holdings. There were in this year 210,736 farms under cultivation. About 273,700 acres are in vineyards and orchards, representing an investment in vineyards alone of 414,000,000 pesos. 3,342,400 acres are cultivated in cereals, beans, peas, potatoes and other vegetables. Excellent wine is made, 4,624,900 litres being exported in 1931, chiefly to Germany and Belgium. Tobacco output from 7,950 acres in 1930 was 6,035,400 kilos. In 1931-32, harvests in metric tons were: wheat, 576,600; barley, 67,400; oats, 71,500; maize, 75,000; potatoes, 409,700.

The valleys of the south are used for cattle grazing, and dairy farms. The production of butter and cheese is on the increase. There were 2,387,940 cattle in 1930. Fresh and frozen meats are exported. In Patagonia and Tierra del Fuego there are large tracts devoted to sheep-farming, chiefly by British subjects. There were 263,482 sheep in 1930, and the wool export in 1931 totalled 10,137 tons. Frozen mutton is also exported. Extensive natural forests are found. Soap bark is exported, principally to Germany, 1,683 tons being sent out of the country in 1931.

In 1928, Chile had 8,585 manufacturing establishments with 97,832 employés, which included 4,762 foreigners. Abundant electric power greatly facilitates manufacture.

A commercial treaty was concluded between Chile and Peru on March 17, which the Government believes will greatly stimulate the development of trade. Chile, as well as other South American republics, joyously received the news of the change in tariff policy of the United States and the end of the old tariff war, which according to the South American press, was responsible for "most of the miseries and sufferings and many of the social and political perturbations of recent times." President Roosevelt and Secretary of State Cordell Hull have been lauded at several South American conferences for their sincerity in developing a "looking South" policy and their friendliness towards South America. It has been predicted in Chile that with the reestablishment of American purchases here, there will be "no end to Chilean buying."

Transportation. In 1930, there were in Chile 3,600 miles of State Railways, and 1,940 miles of private railways, chiefly British-owned. Electrification of the railways on the line between Valparaiso and Santiago, 115 miles in length, was begun in 1921. Aviation is highly developed both within Chile and between the country and foreign points. A plant for the manufacture of airplanes was established in 1930. The country is well supplied with telephone, telegraph and wireless stations.

There were in 1930 about 24,414 miles of highways, of which only thirty-seven miles could be called first-class and 358 miles are second-class. About 16,000 miles can be used for motor traffic. Navigable rivers total 851 miles, and there are 497 miles of navigable lakes. Tourist traffic in 1932 was the heaviest in years, aggregating 15,000 travellers.

Population. The population of Chile is almost entirely of European origin. The natives are of three branches, the *Fuegians,* chiefly nomadic, in Tierra del Fuego and nearby territory; the *Araucanians,* numbering 101,118 in 1930, inhabiting the valleys and the western slopes of the Andes; and the *Changos,* who live in the northern coast region and work as laborers. In 1885, the entire population of Chile numbered 2,507,380; in 1920, the number had increased to 3,371,573; and in 1930, the population was 4,287,445. Of this number, about 49.4 per cent were urban.

Santiago, the capital, was founded in 1531 and had a population in 1932 of 702,431. Valparaiso, the chief seaport, was founded in 1536 and has a population of 189,119. Magallanes in the Strait of Magellan is the southernmost city in the world, and the center of a flourishing sheep industry. Its population in 1930 was 24,307. Other cities, with their populations in 1930, are: Concepción, 77,589; Iquique, 46,458; Antofagasta, 53,591; Talca, 45,020; Chillán, 39,511; Temuco, 35,748; and Valdivia, 34,296.

Education. Education is free and maintained at State expense. Since August 26, 1920, it has been compulsory. There were in 1930, 3,860 public and primary schools with 559,016 pupils and 9,856 teachers; 175 public and private secondary schools with 51,624 pupils and 2,438 teachers; six public normal schools, and ten public commercial schools. The State University of Chile at Santiago had 3,338 students in 1930; and the Catholic University of Santiago numbered 1,049 students. There is also a University at Concepción, and a school of technology in Valparaiso, besides agricultural schools, schools of mines, professional schools, and lyceums and colleges established in the capitals of the provinces. A fundamental reform of the educational system is in progress, including plans for 600 new modern schools at a cost of $7,200,000. The Roman Catholic religion was maintained by the state until 1925, and is still dominant. All religions are protected.

Government. The Republic of Chile threw off the Spanish yoke and declared a national government on September 18, 1810, finally freeing itself in 1818. By the Constitution of October 18, 1925, legislative power is vested in a Chamber of Deputies, each elected by direct vote of the people. There are forty-five Senators elected for eight years from nine provincial groups of departments, each of which elects five Senators. One-half of the Senate is re-elected every four years. The Chamber of Deputies had 132 members elected, one member for every 30,000 inhabitants or fraction of not less than 15,000 by departments or groups of departments. The electorate (registered literate citizens of at least twenty-one years of age) numbers 368,436, of whom 287,000 participated in the presidential election of October 4, 1931. All voting is by ballot. The President is elected for a term of six years by a direct popular vote and is not eligible for a second term. He has a modified veto in legislation. He is assisted by nine Ministers of State, whom he appoints. They constitute his Cabinet and are responsible to him; they may speak in Congress but may not vote. For local governmental purposes, the Republic is divided into Provinces, which are subdivided into departments of one or more municipal districts each.

All of the able-bodied citizens are liable for service from their twentieth to fiftieth years, in the national militia of which the army is composed. Chile is divided into four military districts, each of which furnishes a complete division on mobilization.

History. The northern part of Chile originally belonged to the Incas of Peru, the southern part to the Araucanian Indians, the only tribe unconquered by the Spaniards, who were until recently independent even of Chile. The first European to land in the country was the Portuguese discoverer Magellan, who came to Chile in 1520 after his famous voyage through the strait that bears his name. In 1535, after Pizarro had completed his conquest of Peru, his lieutenant, Diego de Amalgro, headed an expedition overland to Chile. Another expedition under Pedro Valdivia in 1540 annexed territory as far as the river Maipu, and founded Santiago in 1542. Almost continuous wars with the natives occupied the next 250 years, which were further blackened by heavy slave traffic and the Inquisition.

In 1810, a revolt against Spain began under the leadership of Don Bernando O'Higgins, son of a viceroy of Peru, but a native of Chile. He became the first dictator of the country. The constitution was adopted in 1833, but the country remained in an unsettled condition until 1847, and a revolution broke out in 1815. In 1864 Chile gave valuable support to Peru in her unsuccessful war with Spain.

Boundary disputes with Bolivia, involving the nitrate deposits in the Atacama Desert, led to a declaration of war in February, 1879. Immediately, Peru declared a secret treaty, offensive and defensive, made six years before, with Bolivia, and accordingly entered the war against Chile. In spite of this, Chile overwhelmingly defeated the allies, fighting often against great odds and superior forces. A treaty dictated by Chile was finally signed, October 20, 1883, by which she secured from Bolivia the province of Antofagasta and from Peru that of Tarapacá, with Tacna and Arica for a ten-year period, at the end of which time a plebiscite would determine if the provinces remained with Chile or returned to Peru.

The unconstitutional government of President Balmaceda led to civil war in 1891, in which the law-abiding congressionalists were successful, Balmaceda committing suicide after the decisive battle near Valparaiso, August 28. In this same year war was threatened with the United States, because of an attack upon American sailors in the streets of Valparaiso.

During the administration of Frederico Errazuriz, the boundary dispute with Argentina became critical, and was settled under his successor, German Riesco, with American and British assistance. After this, Chile and Argentina signed a permanent arbitration treaty in 1902. The Alsop claims, of long standing, which in 1909 threatened trouble with the United States, were adjusted in 1911, through the arbitration of Great Britain.

Chile had postponed taking the Tacna-Arica plebiscite until a dispute with Peru had reached alarming proportions. The President of the United States was named arbiter in 1922, but the question dragged on until 1929, when a treaty was signed at Lima, June 30, which returned Tacna to Peru, and permitted Chile to keep Arica, with payment of $6,000,000 to Peru.

A number of prominent exiles attempted a revolution at Concepción on September 21, 1930. It was a failure. The Government, aroused by student and political agitation, became watchful of revolution, and police frustrated a plot to blow up a bridge over which the President's train was scheduled to pass on December 9, 1930. In February, 1930, President Ibañez assumed extraordinary powers, and on February 4, 1931, he was given dictatorial powers by Congress. Economic depression, revolution, and a naval mutiny further complicated his rule. He resigned on July 26, 1931, after the fall of four cabinets, and fled to Argentina. The presidential elections of October 4, 1931, after three acting presidents had served, brought relief to Chile with the election of Juan Esteban Montero. On December 25, a Communist attack on Copiapo, capital of Atacama, was quelled. Unrest continued, with increased economic depression. Martial law was declared on April 8, 1932, after another Cabinet had fallen. On April 19, the gold standard was suspended. A comparatively bloodless revolution overthrew the government June 4, 1932. Carlos G. Davila, former Ambassador to the United States, headed the Junta in power. The Communist wing agitated for its candidate, Grove, with the result that both men lost out, and a general election on October 30, 1932, made Arturo Alessandri, Moderate Socialist and former president (1920-25) president for six years. Congress granted him extraordinary powers April 28, 1933. On May 7, he reviewed in Santiago the "White Guard," 15,000 Fascists pledged to support the civil government in Chile.

A plot against the Chilean Government was thwarted on January 2, and its revolutionary instigators arrested. The Government also ordered the arrest of former President Ibañez and Pablo Ramírez, one time Finance Minister of Chile. A Fascist organization, composed of a group of National Socialists, was recently organized in Chile under the leadership of Fernando Ortúzar. They are known as "storm troopers" throughout the republic. The Government is executing the "extraordinary powers" granted it by Congress in December, 1933, for effectively quelling any revolutionary movements which may threaten the peace and security of the republic.

See Andes Mountains; Araucania; Atacama Desert; Balmaceda, Jose Manuel; Concepcion; Fuegians; Fuego, Tierra del; Iquique, Battle of; O'Higgins; Bernardo; Santiago; Valdivia, Pedro de; Valparaiso.

Chillicothe (*chĭl-ĭ-kŏth'ē*), the seat of Ross County, Ohio, is situated on the Scioto River and the Ohio Canal, fifty miles south of Columbus and 100 miles east of Cincinnati. It is a railroad center for the Baltimore and Ohio; Norfolk and Western; and Scioto Valley railways. The city has some beautiful public buildings, including the courthouse, public library, and schools. Its manufactures include paper, flour, carriages, engines, agricultural implements, and shoes. Chillicothe was first settled in 1796 by whites under Nathaniel Massie, nine miles from the site of the Indian village of the same name. The Indian Chillicothe was unsuccessfully attacked in May, 1779, by Kentuckians under John Bowman, and was burned by Colonel Clark in August, 1780. The present Chillicothe was the capital of Ohio from 1800 to 1810. In 1930 the population was 18,340.

Chilkoot (*chĭl'ko͞ot*) **Pass,** a pass in the coast range of the Rockies, on the main route from the South Alaskan coast to the Canadian south region of the Yukon, including the gold fields of the Klondike and other rich deposits in the upper basin of the Yukon River. It is situated just north of Skagway, starting in Alaska, but having its highest point just over the Canadian border, at an altitude of 3,500 feet, at which point the British have a customhouse. Although snow-covered, the pass, which is twenty-nine miles long, is open during the greater part of the year. It was important on the route of the gold-seekers in 1896-98, but has since been superseded by the railway over White Pass, which was completed in 1899.

Chimborazo (*chĭm-bô-rä'zō*), a cone-shaped peak, is situated in the west Cordillera of the Andes, in the republic of Ecuador. It rises to a height of 20,498 feet. For long it was thought to be the highest peak in the world, and is the highest peak in Ecuador. Its snow-clad top, called the Silver Bell, can be seen from the Pacific Ocean, although it is 150 miles inland. The mountain was first scaled by Whymper in 1880.

Chimborazo is also a province of Ecuador. It has an area of 2,989 square miles. It is famed for the large sulphur deposits. The estimated population of the province in 1931 was 215,000. Riobamba, the capital, has a population of 21,200.

See Ecuador.

Chimera or **Chimæra** (*kĭ-mē'rȧ*), a mythological female monster, having a lion's head, a goat's body, and a dragon's or serpent's tail. The monster breathed fire at its enemies. According to the ancient myth, it was slain by Bellerophon with the aid of Pegasus. The symbolism of the myth interprets the chimera as a volcano with lions for crags, goats on its rocky sides and serpents in the marshes at its foot. Bellerophon, by making his home on its slopes, subdued it. It has been variously represented in painting and sculpture. To-day, the word is used for any vain, foolish, or monstrous fancy or creature of the imagination, or any incongruous union.

Chimney-swift, a small, sooty-grey, swallow-like bird, often mistakenly called the chimney-swallow, to which it is not even distantly related. Its flight is stiff and mechanical, but long-sustained and rapid, which gives it its name. It is reported to travel 1,000 miles in twenty-four hours, stopping only to roost. It does not perch, but clings to a rough surface by its sharp claws and tail. Its shelf-like nest, built in an unused chimney, is almost flat, woven of sticks fastened to the wall by a glue that flows from the mouth in breeding season. This glue becomes hard and strong, fastening the nest securely. Narrow wings, each an inch longer than the total body length of the bird, support its flight. It is almost continuously in the air, rarely alighting except at the nest. With beak and feet it breaks off sticks for the nest while in flight, and feeds in flight, going through the air with mouth agape, and ridding the air of gnats and mosquitoes. It flies especially in the late afternoon and evening, and early morning. Chimney-swifts are migratory, spending the summers in Labrador and the fur countries, and the winters as far south as Florida and Central America; and breeding from Labrador to Florida and as far west as the Great Plains.

Chimpanzee (*chĭm-păn′zē* or *chĭm-păn-zē′*), a black anthropoid ape, living in the equatorial forests of Africa. It is the best-known of the manlike apes, as it is easily tamed when taken young, and therefore often seen in captivity. It is smaller, more arboreal and less ferocious than the gorilla. It has a rounder head, large ears, and a broad, leathery, reddish-brown face. It attains a height of four to five feet. It has no tail, and while it can easily stand or walk erect, it habitually uses its long arms in walking, placing its knuckles on the ground. The chimpanzee is a social animal, living in small colonies, in pent houses in the thick forests. The diet is mainly wild fruits with occasional animal food. Chimpanzees are noisy but afraid of man; they are very imitative. Some of the African natives use the flesh for food. The chimpanzee is unique among anthropoids in having the spine of the second neck vertebræ bifurcated as in man. Although the brain is about half the minimum size of a normal human brain, it contains all the ridges of the brain of man.

China, Great Wall of, a wall constructed in the Third Century B.C., which extends along the northern frontier of China from the northern part of the Gulf of Pechili on the Yellow Sea, North of Peiping to Syning on the border of Turkestan. According to Professor Geil, who visited the wall in 1908, its total length is approximately 2,550 miles. There are 25,000 watch towers built in the wall, and 15,000 detached watch towers. At Kalgan, the wall measures seventeen feet, six inches thick and sixteen feet high. It is constructed of two strong retaining walls of brick rising from granite foundations, with the space between filled solid with stones and earth. The top was originally covered with bricks, but is now overgrown with grass in most places, as much of the wall is in ruins. It was originally intended to keep back the Tartars, and the towers were erected at one-hundred yard intervals, for observation and defense. Recent researches claim it is no more ancient than the fourteenth century, but history records that the wall was constructed during the reign of Emperor Shih Huang-ti (221-200 B.C.) of the Tsin dynasty. Its length was increased by 300 miles in 1547 during the Ming dynasty.

See CHINA.

China, Republic of, a vast state of eastern Asia, which, prior to February 12, 1912, was one of the oldest monarchies in the world. It is bounded on the north and northeast by Siberia, on the west by Russian Turkestan, on the south and southwest by the Himalayas and French Indo-China, and on the east by the China Sea and the Yellow Sea. The Chinese Republic is composed of China Proper (China of the eighteen provinces), The New Dominion (Sinkiang), and the dependencies of Mongolia and Tibet. Manchukuo, formerly Manchuria, a dependency of China, became an independent state on March 1, 1932. It extends over an area of 3,853,560 square miles.

Surface and Drainage. The topography of China is of a rolling nature. In the north there are the high elevations of the Kinghan and Tarbagatai Mountains in Mongolia, while in the south rise spurs of the Himalayas and the Kwenlun Mountains of Tibet. The entire length of the country, from north to south, is 1,860 miles. Its width is approximately 1,500 miles. China Proper slopes from the mountainous regions of Tibet and Nepal toward the eastern and southern shores of the Pacific Ocean. It has been estimated that less than one-tenth of China's surface is flat. In the west cordilleras line its confines, from which the Yangtze and the Hoang-ho, the two principal rivers of China, flow in an easterly course to the Pacific.

Since the dawn of Chinese civilization ideas in China have been grouped in fives. Five races dwell in China. There are five seasons, five cereals, five virtues, five planets, five classes of society, five rites and five points of the compass, all in accord with the ancient custom. Just so there are five Sacred Mountains in China: Taishan in Shantung; Hengshan in Hunan; Omeishan in Szechwan; Hwashan in

Shensi, and Wutaishan in Shansi. Legend holds that **Confucius** ascended Mt. Taishan in 500 B.C. Each mountain abounds in temples and countless numbers of pilgrims make their way to these mountains annually. In northwestern China the mountains' sharp and rocky peaks are usually separated by wide, flat-bottomed valleys. Due to a process of eroism, much land has disappeared leaving isolated groups of low mountains. The broad valleys are dotted with villages fairly crowded with people.

To the west lies the vast alluvial plain of Hoang-ho or Yellow River. The Chinese, dwelling in little mud-walled villages over the plain, cultivate its deep, fertile soil intensively. Truck gardens flourish here. Little rice is cultivated in this region because of the scanty water supply. West and northwest of the Hoang-ho Plain rise the rugged plateaus and mountain ranges of northwestern China. It is in this region that geologists have been most interested because of the loess or yellow earth which abounds on all sides. These loess beds are extremely rich and especially adaptable to dry farming. Every available inch of ground is cultivated, both the level bottom lands and gently sloping hillsides. The loess covers the subsoil to a great depth and oftentimes splits into clefts. These clefts afford homes for multitudes of the people who dwell in caves dug at the bottom of the cliffs. Sometimes whole villages are so formed, in terraces of earth which rise one above the other.

Rivers are not numerous in China, but wherever possible every natural and artificial waterway is put to use, making China one of the best-watered countries in the world. Here too, the "five" predominates for the principal rivers of China are five: the Yangtzekiang, 3,400 miles long, which flows the entire width of China proper from Tibet to the sea; the Sikiang (West River) which rises in Yunnan and flows to the Kwangsi-Kwantung border; the Hanho, rising on the Shensi-Szechwan boundary, joins with the Yangtzekiang at Hankow. The Hoang-ho or Yellow River is valuable only for drainage and irrigation purposes. It is believed to be one of the most unmanageable rivers in the world. It is approximately 2,600 miles long. The Yellow River rises in Tibet, flowing through northwestern Kansu, thence northward to the high land of Mongolia. There its course changes to the east, and at Hokaw to the south. Near Tungkwan it is joined by the River Wei, the fifth principal river of China, which rises in eastern Kansu. The River Wei flows southeastward to Shensi. It was in the valley of the Wei that Chinese civilization was born. Here, too, lies the most fertile land in all China.

The control of the Hoang-ho or Yellow River is a difficult problem to China to-day. Diking of the river is futile. The river is frequently termed "China's Sorrow" because of the great damage it does during flood season.

Among other rivers in China are the Paiho which waters the plain of North China and empties into the Gulf of Chihli at Taku; the Amur River, 2,920 miles long and navigable for about 1,500 miles; and the Yalu. China's coast line is approximately 2,150 miles long. The Grand Canal, an ancient waterway begun by King Kublai, was built in three sections from 550 B.C. to 1283 A.D. It joins the northern and southern parts of China.

Climate. The climate of China is as diversified as its surface. In the northwest a dry and severe climate prevails, while in the southwest there exists a somewhat humid and subtropical atmosphere. Southwest of the plateau country there exists a region of a generally warmer climate and a more generous supply of rainfall. This central mountain region receives sufficient rainfall to supply the numerous springs and brooks which are in constant use for irrigation purposes. The mild climate makes the cultivation of rice quite profitable.

Minerals. China has extensive mineral resources, particularly coal. Immense stores of coal are found in practically every one of China's eighteen provinces. It has been estimated that coal fields extend over 133,513 acres of China Proper. The average annual coal production is estimated at 29,000,000 metric tons. About ten million metric tons of this output are from native coal mines, seven and one-half million metric tons from semi-modern mines, and 11,196,100 metric tons from the Fushun and Kailan coal mines.

The oldest iron industry in the world is situated in the anthracite field of Shansi. Iron ores abound here and in Chihli, in Shantung, and other provinces. There are approximately 300,000,000 tons of ore at Shansi alone. The Tayeh iron deposits near Hankow, and counted among the richest in the world, have a reserve of 35,000,000 tons.

Petroleum is found on the Upper Yangtzekiang and in Shensi Province. In 1932 there were ninety-one petroleum wells in the country. The shale beds in South Manchukuo and Shansi Province are also a source of oil.

The mining of tin has long been important in China. There is a great supply of tin ore in Yunnan. Tin is the chief mineral export of the country. The annual production is estimated at about 10,000 tons.

Since 1908, China has produced more than sixty per cent of the world's total production of antimony. Ninety per cent of China's antimony is produced at Hunan. In 1930 there were 14,700 tons produced.

Other important minerals of the country are wolfram which is mined at Swatow and Kiangsi and Hunan Provinces; molybdenum ore, mined at Yungtauh-sien, in Fukien and Kiangsi Provinces; bismuth, and salt. In 1930 there were 2,562,000 tons of salt produced.

Production and Industry. China is primarily an agricultural country. In the days of the monarchy the emperor began the season each year by turning over a few furrows in the

Sacred Field himself, while the empress in the same way started the work among the silkworms, the care of which is left to the Chinese women. To-day land is for the most part freehold held by families on the payment of an annual tax. It has been estimated that arable land in China totals about 192,060 square miles. The holdings are usually small and agriculture in China is intensive rather than extensive. Farmers practise the rotation of crops and irrigate their lands frequently. The Chinese are intensely interested in horticulture. There are many varieties of fruit trees. It has often been said that the Chinese are "gardeners rather than farmers." The principal crops in northern China are wheat, barley, maize, peas and beans. Rice, sugar and indigo are cultivated in southern China. The Yangtzekiang Valley is especially adapted to the production of cotton. In 1932 there were approximately 2,158,000 bales of cotton produced. The staple food of the Chinese, rice, is grown in fifteen provinces of China Proper. China also raises important fibre crops, chief among which are abutilon, hemp, jute, ramie and flax.

There are about 520,000 acres in western and southern China devoted to the production of tea. Since 1895 Chinese tea has met with severe competition in Ceylon and Indian teas. In 1895 there were 248,757,533 pounds of tea produced in China. In 1932 the production had dwindled to 86,140,080 pounds.

Pigs are raised in every section of China. One of the principal articles of export is pig's bristles. Camels are raised in Mongolia for the valuable camel's hair they produce.

China is the home of the silk industry. The mulberry grows everywhere, and the silkworm has been cared for since the twenty-third century B.C. For more than 4,000 years it has flourished. To-day China produces twenty-seven per cent of the world's silk supply. In the twentieth century China was forced to give way before Japanese competition and yield first place in the silk industry to Japan. In 1929 China exported 23,998,532 pounds of raw silk. In 1932 the silk exports totalled 10,220,111 pounds. Forty per cent of China's silk cocoons are produced in the central provinces of Kiangsi, Chekiang and Anhwei.

In 1917 the production of opium in China ceased, as did the Indian importation into China. On May 8, 1911, an agreement was concluded between China and Great Britian which provided that China should diminish the native production of opium annually in proportion to the Indian export. Great Britain agreed that the Indian importation into China should be discontinued immediately upon the cessation of Chinese native production. Both practices came to a halt in 1917.

The principal manufactures are cotton and silk goods. Since 1895, when by the Treaty of Shimonosiki it was possible for foreigners to import machinery and engage in manufacturing, China has done much towards developing her cotton and wool mills and establishing silk filatures. In 1895 China had six native owned cotton mills with 183,000 spindles. In 1932 there were eighty-four Chinese mills with 1,757,248 spindles, and two British mills with 160,610 spindles. Shanghai is the principal center of cotton manufactures. The cotton industry is of especial importance since the majority of China's inhabitants wear cotton clothing.

There are seventeen silk filatures throughout China, principally at Shanghai and Canton. Native looms are to be found in almost every dwelling. China also has rice and flour mills. Flour milling is rapidly becoming more important. Shanghai, alone, has 173 modern mills, although in 1930 there were but eighteen in operation. There are eleven mills at Tsingtao, six at Wusih, and five at Hankow. China also has huge iron works at Hanyang near Hankow. There are about 445 glass factories through the Republic and thriving steel works.

The principal exports of China are silk, beans, tea, skins and furs, cotton, tin, antimony, sesame seed, cereals, peanuts and peanut oil.

Transportation. China maintains the rule of "five" even down to the highways. There are five important types of highways found throughout the republic: waterways, footpaths, pack trails, cart roads, and railways. Poor roads have always been associated with China. Improved roads are needed everywhere. There are five types of native transportation in use: boats of all types, from junks and canoes to the engine-driven craft; picturesque carts, always springless, which are especially popular in Northern China; wheelbarrows in Central and Northern China oftentimes pushed by man and donkey; bipeds or humans carrying loads on their backs by means of a balanced rod or pole across the shoulders; and the quadrupeds which includes horses, mules, camels, oxen and yak. The latter are used in Northern and Western China.

One of China's unusual developments toward rapid transportation has been the "launch train," used especially in the middle and lower sections of the Grand Canal and in the Canton delta. This craft is used for both passengers and freight. Shipbuilding yards have developed rapidly in Shanghai and Canton.

The most rapid transportation, however, is afforded by the railways. The first railway in China was opened in 1876. In 1931 there were approximately 12,335 miles of railway in the Republic. The American Red Cross has constructed 1,000 miles of highways in the four northern provinces for the purpose of creating useful employment for famine sufferers. Road mileage had increased to 40,400 under the Nationalist government. There are 30,000 miles of road under construction. The problem of defense has somewhat interrupted the development of transportation, and the roadbeds have fallen into a state of deterioration. There were 38,136 automobiles registered in 1933.

Education. A new educational movement has been under process of development in

China since 1905. Schools of "western learning" have been springing up throughout the Republic. Primary schools are of two kinds, the higher, established by district governments, and the lower, established by local government boards and also termed "Citizen Schools." Many lower schools have also been founded with private funds.

Among China's institutions of higher learning are the National University at Peiping, which was organized in 1898 and reorganized in 1917; Wuchang Normal University; Chung Chow University at Kaifeng; National South-Eastern University at Nanking; North-Western University at Sianfu in Shensi Province; Tung Luh University in Yunnan Province; Peiping Normal University, and Hangchow University. On July 21, 1921, there was opened the Chiaotung Communications University, under the direction of the Ministry of Communications. This University now exists as three colleges, each having a university status. These colleges are maintained at Nanyang, Shanghai; Tangshan, Chihli Province; Communications, Peiping. The Peiping Union Medical College, founded in 1906, came under the support of the China Medical Board of the Rockefeller Foundation on July 1, 1915. There is a modern university for China and British professors in Hongkong. In 1929-30 the Ministry of Education granted certificates to 1,484 students to study abroad. About eleven per cent of this group, or 162, were women students.

Religion. The majority of China's inhabitants are Buddhists, although China acknowledges three religions: Confucianism, Buddhism, and Taoism. Throughout every corner of the Republic ancestral worship is still observed. This is perhaps the only outward ceremonial which is left Confucianism. Elaborate ritual accompanies the worship of Buddhism and Taoism. Nearly all the Chinese (with the exception of Mohammedans and Christians) profess and practise all of the three acknowledged religions.

Mohammedans, found throughout the whole of China, are most numerous in Kansu, Sinkiang, Shansi, Shensi, Chihli and Yunnan. Peiping alone has 30,000 Mohammedans and thirty mosques. It has been estimated that there are 20,000,000 Mohammedans throughout the Republic.

Roman Catholicism first made its appearance in China three centuries ago. In 1929 there were seventy-six bishoprics, 3,616 foreign missionaries, and 2,486,841 native Christians in China. The first Protestant missions were established in 1807. To-day the Protestant Mission maintains twenty-seven colleges of university standing in addition to its middle and higher elementary schools.

The hill-tribes of China are still nature-worshippers. They are a distinct ethnic group from the Mongoloid population. A colony of Chinese Jews exists in K'aifêng, capital of Hanan.

Population. The origin of the Chinese people has been a perplexing problem to anthropologists and ethnologists for centuries. The Chinese themselves are ignorant of their origin and know not whether their history is one of mythology or of legend. The Chinese race is predominant despite the fact that the north is inhabited by the Eastern Mongolian race, the northeast by the Manchurian race, the northwest by the Turku race, the west by the Tibetan race, and the southwest by the Miatose race. Ethnically speaking, all the races in China belong to the Mongolo-Tartar family. It is interesting to note the physical differences in the inhabitants of the North and the South. The Chinese of the North are generally tall, strong, robust and fearless. The Chinese of the South, although a more gentle and weak people, are more inclined towards literary pursuits and excel their northern brothers in art, industry, and business. The head of this race is brachycephallic (or round horizontally) and the forehead low and narrow. The Chinese are further distinguished by prominent cheek bones, almond shaped eyes, oblique upward and outward, and a yellow complexion. They are usually stout, temperate, industrious, cheerful and easily contented.

In 1932 the Ministry of the Interior compiled statistics which estimated the total population of China at 474,787,386. Of this total 370,393 were foreign residents. There were 66,479 Russians living in China in 1931; 260,621 Japanese; 13,344 British, and 8,637 Americans. The principal cities of the Republic are: Shanghai (including neighboring districts) 3,259,114; Tientsin, 1,387,462; Peiping (formerly Peking) 1,297,718; Canton, 861,024; Hanchow (including Wuchang and Hanyang) 777,993; Nanking (the capital) 633,452; Wenchow, 631,276; Hangchow (municipal area) 506,930, and Tsingtao, 390,337. The International Settlement at Shanghai has a total of 1,007,868 inhabitants, 971,397 of which are Chinese and 36,471 foreigners (1931).

Government. The national government of China is a Committee Government representative of the *Kuomintang* or Nationalist Party. It is composed of five *Yuans* or councils, the Executive, Legislative, Judicial, Examination, and Control. Each *Yuan* has a president and a vice-president, who like the President of the Republic and the twenty-four to thirty-six Government Councillors, are selected by the Central Committee of the *Kuomintang.* The councils function as a national congress or parliament. The highest organ of the National Government is the Executive Council. The Control Council is a supervisory organ and exercises the powers of impeachment and auditing. In January, 1932, there was a Cabinet of Ministers appointed. The present capital of China is Nanking, which is being planned as a modern capital. Peiping (Peking), the former capital, is now the educational and cultural center of The Republic.

In July, 1928, a distinction was made between special and ordinary municipalities by the creation of six special municipalities at Nanking, Shanghai, Tsingtao, Tientsin, Hankow and Canton. This distinction was revoked in May, 1930, although a difference still exists between municipalities under the direct control of the Executive *Yuan* and those under provincial control. In municipalities under the control of the Executive *Yuan* the Mayor is appointed by the Government. In those municipalities under provincial control the Mayor is either recommended by Provincial authorities (and approved by the Central Government) or directly appointed by local authorities.

History. The history of China and the development of its unique civilization takes one back to antiquity. The origin of the Chinese race, however, is an unsolved problem. China's first historic dynasty was the Chan Dynasty which was established in 1122 B.C. and continued for nine centuries. This was the age of Confucius, Laotze and Mencius. There followed the Tsin Dynasty, founded by Emperor Shih Huang-ti (221-200 B.C.). It was during his reign that the Great Wall of China was completed along China's northern frontier to prevent the inroads of the northern barbarians. The Han Dynasty (206 B.C.-251 A.D.) followed the Tsin and during this period the boundaries of the Chinese Empire were extended. There followed a period of civil war in which China was divided into Three Kingdoms—Wu (east), Shu (west), and Wei (north). The Empire was reunited under the Tang Dynasty (618-907 A.D.) and China entered a new era of prosperity. The Sung, Mongol, and Ming dynasties preceded the Manchu Dynasty which reigned for 267 years in China, and gave way before the Republic in 1912. The Manchus came to the throne of China in 1644. It was styled the *Ta Ch'ing Ch'ao* ('Great Pure Dynasty'). The last Emperor was Pu-Yi who succeeded to the throne on November 14, 1908, upon the death of his uncle, Emperor Kuang-Hsü. Although no caste system was ever developed in China there have always been two persons of prominence in the country—the ruler and the sage. The sage, or Man of Intelligence, advised and helped the ruler and taught his people lessons of truth and duty. There consequently grew up the custom that all officers of the government must be educated. China, before the Republic, was governed by the Emperor through the Grand Cabinet which held session daily between four and six a.m. The provinces were governed usually by a viceroy acting for the Emperor. The rank of the different provincial officers was indicated by a knob or button on the top of their caps.

The very symbol of the "unchanging East" in her intense conservatism and apparent indifference to the movements of the world beyond her boundaries, her own easy and swift defeat by Japan and the subsequent victory of Japan over Russia produced a profound change in China and the mental attitude of the Chinese people. It convinced the leaders of national thought of the utter incompetence and corruption of their Manchu rulers and of the superiority of Western education, military and industrial methods and ideals. Demands were soon forthcoming for better government, the right to participate in government, the increase and modernization of the army, the substitution of European for Confucian subjects in the Civil Service examinations, and the establishment of schools similar to those of America and Europe.

Alarmed by these rumblings of the gathering storm, the government began the usual process of making pretended concessions. Late in August, 1908, an imperial decree announced that nine years from date—that time being required to fit the people for the proposed measure of self-government—a parliament and constitution would be granted. This failing to quiet popular discontent, another edict, three years later, provided for a cabinet and council to assist the emperor, but a president under the control of the throne was given the right of veto over other members. Exasperated by the delay in establishing real constitutional government, the people rose in various parts of the empire until the uprising assumed the form of a general rebellion and within a few months had become a revolution. Beginning in September, 1911, it was practically ended by December, and on December 29, Dr. Sun-Yat-Sen, who was educated in America and who had been particularly active in the campaign, was elected president of the "Provisional Government of the United Provinces of China." The child emperor, Pu-Yi, through the regent, abdicated, and on February 12 issued a proclamation which closed the 267 years reign of the Manchus and established the Republic of China. The premier of the empire, Yuan-Shih-Kai (*Yo͞o-än′ shē ki′*), was chosen president. Dissensions, particularly over the finances, arose between the new president and the council and Yuan-Shih-Kai made himself emperor. He died a short time later and Si-Yuan-Hung, the former vice-president, became president. In 1917, the element who favored the old order of things made a futile attempt, under the leadership of Chang Hsun, to restore the monarchy.

Central authority was so weak, however, that various war-lords of the provinces began another civil war in 1919 which was not entirely settled when Tuan Chi-jui became president late in 1924. Suffering under the personal ambitions of these war-lords, with an unstable government, and with foreign nations insistent on guarding their investments, it was most fortunate for China that the Washington Conference of 1922 brought about an agreement among the nations to respect her sovereignty.

From 1924 to 1928 rivalries between China's military leaders and war-lords came to the fore. In the spring of 1928 the Nationalists became the dominant party and took possession of Peking. It was in this year that the city's name was changed to Peiping and the national capital moved to Nanking. In October, 1928, General Chiang Kai-shek became President of China. The Republic experienced disaster in 1931 with the flood, the establishment of a rival government at Canton, and the Japanese invasion of Manchuria. In December, 1931, General Chiang Kai-shek resigned as President only to assume the rôle of unofficial dictator when Japan attacked Shanghai. Internal conditions in China since 1932 have been most discouraging. In the latter part of 1933 there arose the Fukien revolt.

The civil war in southern China continued during the early part of January, 1934. The Fukien Rebellion was still the dominant problem confronting the Nanking Government. The "People's Republic of China," an independence movement in Fukien Province, had its chief support in the Nineteenth Route Army. General Chiang Kai-shek, who had been planning a military campaign against Communists, was the chief object of the rebel's attack according to Foreign Minister Chen.

"I can state categorically that there is no separatist movement in Fukien Province. The action of the Nineteenth Route Army envisages the entire territory of the Chinese Republic as one and indivisible, the fundamental purpose being to save China, not to break up the nation. The movement aims at ending the power of Chiang Kai-shek and his ruling clique at Nanking in order to dedicate the entire nation to the task of saving China and her vast material resources and man-power from alien domination and control inherent in Nanking's pro-Japanese policy.

"The movement also aims at the liquidation of the political system which has led to the ruthless exploitation of the Chinese people in the interest of Nanking's Kuomintang despotism which has caused the peasants to starve, under a tax system which 'scrapes the earth' in order to enable Nanking's suppression of the Nineteenth Route Army and others unwilling to see China conquered."

For several days fighting continued along the Fukien-Chikiang border. Air bombing practically destroyed the strategic towns of Taishun and Chingyuan before General Chiang Kai-shek surrendered them to General Tsai Ting-kai and the Nineteenth Route Army. Serious fighting also occurred in the mountainous regions in the vicinity of Kingyuen and Pucheng in the northern part of Fukien Province. The combined forces of the Nineteenth Route Army and Communists numbered 135,000. It was reported that they were well equipped with modern arms and excellently drilled to fight with spears and scythes. The Nanking Government forces numbered about 150,000. Military expenditures were enormous. Plans were outlined to attack the rebels by land, air and sea. The rebellion came to an abrupt end on January 13. On that date a Nationalist naval force entered Foochow and the Nineteenth Route Army fled ignominiously. Yenping and Shuikow had been occupied by the Nationalist forces a few days previously. It was rumored that Mme. Chiang Kai-shek had played an important rôle in bringing about the retirement of the rebel forces. The Nationalist victory was also due in large part to the assistance of a volunteer neutral group of Southern Fukien Province. With the collapse of the rebellion and the situation well under the control of the Nanking forces, the American marines that had been stationed at Foochow were immediately withdrawn. The attempt to destroy Chiang Kai-shek's power and put an end to his centralizing policy seemed to have failed for the moment. Criticism of the Nanking commander, however, persisted.

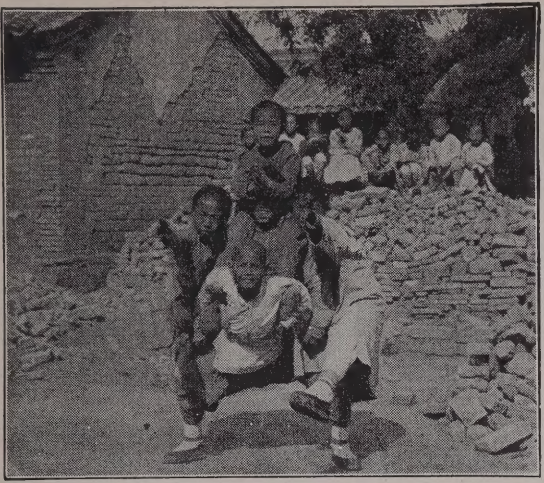
Kwangsi and Kwantung, as well as the Tuchins and younger members of the Kuomintang evinced extreme jealousy of the general and fear of his policies. Little has been accomplished towards the unification of China's provinces. Several provinces, including Kwantung, Yunnan, Kweichow, Shensi and Kansu, still maintain virtual independence. Internal dissension is raging throughout Sinkiang Province. Communistic forces are still at work. Little or no attempt is being made by the Kuomintang to unify or reconstruct the country. Rather is it concentrating upon foreign affairs.

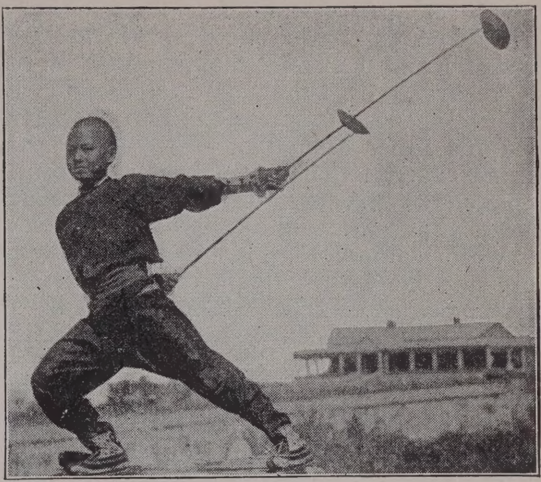
Early in February China sought to obtain a revision of the Sino-American Commercial Treaty of 1903. That treaty contains extraterritorial provisions. In order to secure a modification of those provisions it was stipulated that China must reform its judicial system. In the event that such reform was accomplished the treaty would be subject to revision at the close of ten-year periods. China now seeks a new treaty from which extraterritorial provisions would be excluded. The possibility of such a treaty was being considered in February by American Minister to China, Nelson T. Johnson, and China's Ministry of Foreign Affairs.

China's fears of a new Japanese invasion into Inner Mongolia were aroused in the latter part of March when Japan strengthened her forces at Dolon-nor, which is situated near the border of Jehol and Chahar provinces, to 5,000 men and concentrated an air force at Kuyan. The result of such manœuvres was a Chinese military conference which convened in Peiping on March 20. Chinese authorities suspect that Japan is preparing to conduct a new drive westward into Inner Mongolia with the object of cutting off the one land route still remaining between China and Soviet Russia, that which connects Kalgan with Urga.

Marshal Chang Hsuch-liang, China's youngest war-lord and former Governor of Manchuria, is at Hankow in conference with his subordinates who are in command of troops at Tientsin and in the provinces of Hopei and Honan. Marshal Chang just recently returned from London where he spent six months in an intensive study of the British army. His sudden

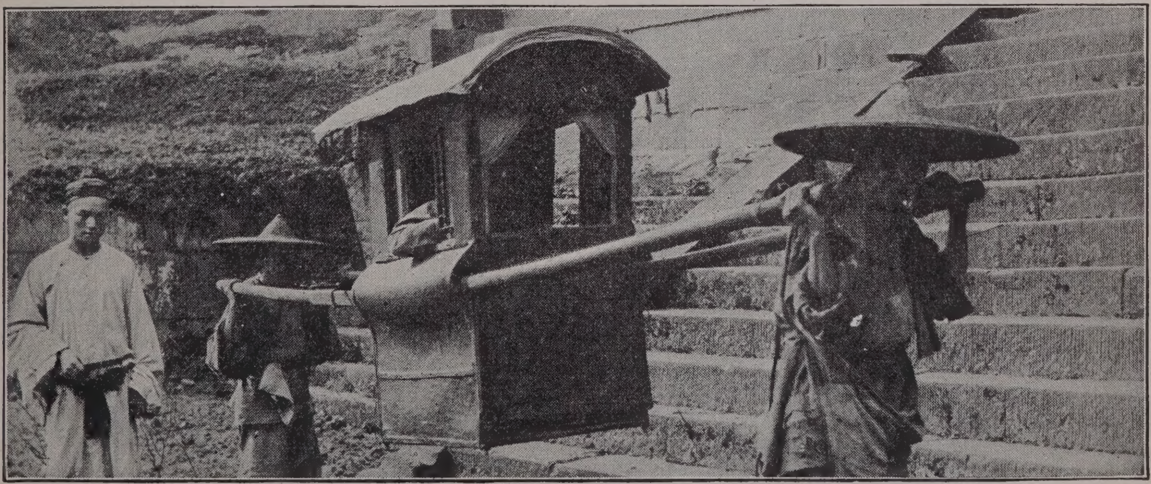
WUNG FOO'S WORK AND PLAY





These Chinese school children are playing a Chinese game called "The Dragon Head." On your right is a Chinese boy who earns his living by street exhibits of sleight of hand, such as spinning plates.

The Chinese in cities buy water of these native carriers. That Chinese farmer raises poppies from which opium is made that is the curse of his people. See his opium pipe?



For a fraction of a cent you can have a "street-car" like this all to yourself in China. It is the native Sedan chair and is quite comfortable to ride in.

return to Asia gave rise to persistent rumors that war is brewing in the Far East and in the event of a Russo-Japanese war the young warlord will seek to regain his lost power in Manchuria. The coronation of Henry Pu-Yi as Emperor Kang Teh of Manchukuo on March 9, is regarded by China as an indication of further Japanese aggression into northern China and Inner Mongolia.

China charges that Japan has but recently completed construction on a highway which connects Chengteh, capital city of Jehol Province with Dolon-nor. This new highway is also connected with Kalgan, one of the most important cities of Inner Mongolia.

Great Britain has extensive vested interests in the Far East. The British coal mines at Tangshan were the scene of a strike on March 19. The site occupied by the power plant is within a neutral demilitarized zone between Peiping, Tientsin and the Great Wall of China. The striking miners, who were in the employ of the Kailan mining administration, did much damage to the property of the British power plant. Their demands included an increased wage and shorter hours. The disturbance was quelled by the Chinese police. A state of martial law was declared within the zone. Japan held that the strike was a result of Nationalist agitation. Sino-Japanese affairs are daily becoming more strained. The discontinuance of the peace policy, which was effected in May, 1933, by the truce of Tangku, is today being urged by Chinese organizations. These groups have demanded that the Nanking Government take action against a new Japanese invasion.

For further information, see the following articles:

Surface and Waters. CHINA SEA; HIMALAYAS; HOANG-HO; YANGTZEKIANG; YELLOW SEA.

Cities. CANTON; CHANG-CHOO-FOU; HANG-CHOW; NANKING; PEKING; SHANGHAI; TIENTSIN.

People. MONGOLS; MORRISON, ROBERT; SHANS; TAI-PINGS; TARTARS; YELLOW RACE.

History. ASIA; BOXER RISING; CHINA, GREAT WALL OF; JAPAN; KWANGTUNG; LEAGUE OF NATIONS; MANCHUKUO; MONGOLIA; TARTARY; TIBET.

See also CERAMICS; CHINA-WARE; FINE ARTS, HISTORY OF; GUNPOWDER; LITERATURE; SILK; SILKWORM; WAX; WOOD-ENGRAVING.

China Sea, or **South Sea,** a partially enclosed sea situated off the southeast coast of Asia. It is bounded by China and Formosa on the north; by French Indo-China, Siam and the Malay Peninsula on the west; and Borneo and the Philippines on the south and east. These boundaries embrace British, French, Chinese, Japanese and American dominions. The depth of the sea increases from the south, where it is seldom more than 1,000 feet deep, to the north, where it is more than 13,000 feet in depth off Luzon. Violent typhoons endanger navigation at certain seasons. The Hainan Islands are the only large islands. The chief ports on the sea are Manila, Singapore, Bangkok, Saigon, Canton, and Hongkong. American boys know the sea familiarly as it has been used so frequently in fiction as the scene of adventures with Chinese and Malay pirates, and stories in which typhoons figure. To the north of Formosa lies East China Sea, partly shut off from the Pacific by the Liu-Kiu Islands, a possession of Japan.

China-ware, a fine porcelain originally manufactured in China. It is characterized by fineness of texture, transparency and beautiful color. It was originally a hard porcelain, made from kaolin in China, combined with a siliceous substance. The kaolin enables it to withstand great heat in the furnace. After baking, it goes to the decorator who gives it delicate coloring and design, and returns it to the furnace to have the colors burned in and the rich luster brought out. China-ware was made at least as early as the Han dynasty (206 B.C. to 25 A.D.). Different dynasties were famous for certain colors. The Tsin dynasty (265-419) produced a beautiful blue; the Sui (581-618) a green. Decorative painting of the china or porcelain began with the Yuan dynasty (1260-1368). The oldest extant specimens of china-ware from China are from the reign of Kang-be (1661-1721). There are many to be found with older marks, but few if any are authentic, most of them being deliberate forgeries. China-ware was introduced into Europe in the sixteenth century, and has been manufactured successfully ever since. Japan began making china-ware as early as 1513, and has reached great perfection in the manufacture, the Hizen or "old Japan" ware being noted for elegance and beautiful color. In Italy, the Florence "Medici" porcelain was produced about 1575-1580. France discovered a method for making soft porcelain about 1695, and became famous for her most artistic ware, the Sévres, and the Dresden. France also excelled in the *faience fine,* or Henri II ware. In England, the "willow pattern" china-ware was produced as early as 1780, in the Chinese manner. The most notable English ware, however, was that of Josiah Wedgwood, still a popular favorite in expensive and beautiful china. The Wedgwood classical vases, ornamented by the sculptor Flaxman, became especially famous, and are very costly. Americans find of interest the china-ware made in Staffordshire, England, which commemorates famous events in American history, in pictorial representation on the various pieces.

See CERAMICS; POTTERY.

Chinch-bug, an insect of the family *Lygacidæ.* It is a small bug about one-sixth of an inch long, blackish in color, with snowy white wing-covers marked with a dark spot and line. It is common in the United States, Central America and the West Indies. The chinch-bug is very destructive to grain of all kinds, especially to corn and wheat. It has a sharp beak with which it punctures the grain and sucks the juices, sapping the life of the plant without eating it. It is estimated that the loss from the chinch-bug, which occurs in the United States mainly in the Mississippi Valley, amounts to more than $20,000,000 annually.

Chinese Wall, The. See China, Great Wall of.

Chinook (*chĭ-nōōk′*), an Indian tribe of any of various related groups, originally living on both banks of the Columbia River near its mouth. Today they dwell on reservations, chiefly in Washington and Oregon. The remnants of the Chinooks are to be found especially on the Chehalis, a 4,200 acre heavily timbered reservation in Washington. The word Chinook is a derivation of Tsinúk, the Chehalis name for these Indians. Lewis and Clark first visited the Chinooks in 1805, although they had been known to traders at least twelve years earlier. By 1855 the Chinooks, who had been organized by settlements rather than by tribes (various divisions being Clatsop, Wasco, and Wishram), had become mixed with the Chehalis, with whom they have since almost fused. The principal village was called Chinook, on Baker Bay in Pacific County, Washington, near the mouth of the Columbia River. The culture of the Chinookan Indians was localized from the North Pacific type. They lived in large communal houses of wood, in fairly permanent villages. They had good canoes, as fishing was the chief occupation. They lived chiefly on salmon, roots and berries. Slaves were common. The village was the chief social unit, with a headsman or chief. A distinct characteristic of the Chinookan culture was the lack of secret societies or totemic art. The Indians were often called "Flatheads" as they artificially deformed the skull by fronto-occipital pressure. This custom, originally a definite part of their culture, has since lost force. The white man's diseases operated to destroy the Chinooks. From 16,000 in 1805, they decreased through disease to one-twentieth of that number during the next fifty years. In 1929 there were estimated to be only two to three hundred remaining, living under different names, on several reservations containing ethnic mixtures.

The importance of the Chinooks lies chiefly in their distinctive language, from which a jargon was adapted that has prevailed for years from Oregon to Alaska, introduced by the traders. The Chinookan language has as its most striking features a high degree of pronominal incorporation, a phonetic slightness of verbal and pronominal stems, the occurrence of three genders, and the predominance of onomatopoetic processes. The jargon was a selection of words from the language, without grammar, and much simplified phonetically, combined with a few words from the French, English, and other Indian languages. This jargon had in common use 250 words in 1841, 500 in 1863, and 740 in 1894, with a possible 1,402.

See Indians, American.

Chipmunk, a very wide-awake, sun-loving small squirrel that lives on the ground. It is distributed throughout the eastern, central and western United States, several species being familiarly known. The chipmunk is about six inches long, and is sometimes called the striped squirrel, as the stripes on its gray-brown fur are very prominent. A narrow black stripe down the middle of the back has on either side a stripe of light buff and a stripe of black. The chipmunk somewhat resembles the gopher. When hard beset, it will climb a tree for a short distance, but it prefers the ground, along old fences and hedgerows near the woods. Its worst enemies are birds of prey and the mink, fox and weasel. The latter will follow it even into the farthest recesses of its burrow. The burrow is most artfully concealed, with no track leading to it. A perpendicular tunnel is sunk down several feet, from which a horizontal passage extends for a few yards. A slight ascent leads from this to the chamber, which is carpeted with grass. A second route leads from the chamber to the surface of the ground, opening at some distance from the first entrance. In the cozy nest, well below the frost-line, quantities of nuts and grain are stored for winter use, carried there in the chipmunk's roomy cheek-pouches. Here the little animal lives through the winter months, appearing occasionally on warmer days. Chipmunks are very friendly, chirruping together most sociably, holding animated conversations that are almost musical. In the west, they not only eat nuts, but destroy grain and fruits, especially berries. They are so numerous and active, working great damage, that they are regarded as nuisances, particularly in the Rocky Mountain regions.

Chippewa (*chĭp′ē-wä*) **Falls,** a city and the seat of Chippewa County, Wisconsin. It is situated on the Chippewa River, 132 miles southeast of Duluth, Minnesota, and 100 miles east of St. Paul. It was settled in 1838, and chartered in 1870. The site is near Tone Rock battleground, the scene of the Sioux-Ojibwa conflict. Chippewa Falls has a number of fine public buildings including the court house, public library, McDonell Memorial High School, and the Hanna M. Rutledge Home for the Aged. The State Home for the Feeble Minded and the County Insane Asylum are located here.

The city is especially famed for the pure spring water which is obtained from the Chippewa Springs and shipped to all parts of the United States and the Orient. There is excellent water power which facilitates the development of the city's industries. Chippewa Falls is a center of large lumber interests, and also manufactures canned goods, beet sugar, dairy products, wooden ware, shoes, gloves, woolens, flour, and foundry products. In 1930 the population was 9,539.

Chippewa Indians. See Ojibways.

Chivalry. See Knighthood and Feudal System.

Chlorine (*klō'rĭn*), element number seventeen, discovered by Scheele in 1774. It is a greenish-yellow gas (symbol Cl) of irritating odor, about two and one-half times as heavy as air. Chlorine boils at —33.6 degrees Centigrade, under normal pressure, hence it is readily liquefied at that temperature. The highest point at which it can be liquefied is 146 degrees, which point requires 93.5 degrees of pressure, called the critical pressure. The liquid is heavier than water. Chlorine is exceedingly poisonous; it is very irritating to the mucous membranes and can cause death when inhaled. It was extensively used in the World War. It is a non-conductor of electricity, and dissolves in cold water, forming a solution closely resembling the gas, in properties.

Chlorine is not found free in nature, but is abundant in the form of chlorides, the most familiar of which is common salt, or sodium chloride. Others are sal ammoniac and sylvite. It is isolated by means of oxidizing agents or by electrolysis, and combines directly with most of the other elements. United with hydrogen it forms hydrochloric acid. It is frequently used as an oxidizer in chemical processes. Chlorine is an effective bleaching agent, as it combines readily in water with the hydrogen of the coloring matter. It is used extensively in the cotton and paper industries. It is also a powerful disinfectant and deodorant, destructive to germs of infectious diseases.

See Chemistry.

Chloroform (*klō'rō̇-fôrm*), a colorless, volatile liquid with a pleasing odor and a burning taste. It is prepared by the action of chlorinated lime on alcohol. It has a specific gravity of 1.486 in the liquid form and 4.20 in vapor. It boils at sixty degrees, Centigrade. Chloroform is not inflammable nor explosive. When exposed to the light, it decomposes slowly, and is therefore kept in colored glass bottles. In the presence of an open flame, the vapor oxidizes slowly, forming phosgene gas, a powerful irritant to the mucous membranes or the skin. It is an excellent solvent for many substances, as iodine, sulphur, camphor, phosphorus, and the fats, resins, and alkaloids.

Chloroform is a powerful general anæsthetic. It relaxes the muscles, abolishes reflexes, and produces anæsthesia with a concentration of five per cent vapor in air. It is a direct depressor of the heart, and a slight overdosage is sufficient to paralyze the cardiac muscle, causing cardiac dilatation. The blood pressure is generally lowered, the urinary secretion stimulated and then diminished, with albuminaria a frequent after-effect. The metabolism of fats is depressed. Any change in the rhythm or quality of the pulse while chloroform is being administered is an indication of danger. Unskillful use of chloroform has been known to result in fatty degeneration of the liver, kidneys and heart, or in what is known as delayed chloroform poisoning, which takes place twenty-four hours after the termination of anæsthesia and often causes death in children.

The advantages of using chloroform as an anæsthetic are its pleasant sweetish odor, the lack of respiratory irritation, the securing of complete muscular relaxation, the small bulk required, and the lack of danger from fire and explosion. The disadvantages are the danger of fatality from direct cardiac paralysis, the indirect effect on the heart and medullary centers, and the secondary toxic effect on the liver, kidneys and heart. Deaths from chloroform are sudden, usually with no warning whatever, and occur during induction, in the later stages of a prolonged administration, or several days after the operation.

In 1912, the Committee on Anæsthesia, appointed by the American Medical Association, reported that the use of chloroform as an anæsthetic for major operations was no longer justifiable and should cease even for minor operations. There are other safer anæsthetics now in use, although it is claimed that chloroform is safe in the hands of an experienced administrator.

Chloroform, however, was the first anæsthetic to be discovered, and ushered in the whole realm of painless life-giving surgical treatment. Dr. Samuel Guthrie discovered chloroform in his laboratory near Sackett's Harbor, New York, in 1831. The discovery was made in the same year independently by Baron Justus von Liebig in Germany and Souberian in France. Jacob Bell of London used it experimentally as an anæsthetic in February, and Dr. James Y. Simpson of Edinburgh, Scotland, used it as a general anæsthetic in November, 1847. He was knighted by Queen Victoria for introducing the anæsthetic to England. It was first called "Guthrie's Sweet Whisky." Dr. Guthrie himself, who had been an examining surgeon in the War of 1812, named it "Chloric Ether," as it closely resembled the Dutch product. He first published an account of its therapeutical effects in 1832.

Chloroform was considered one of the greatest boons ever offered to relieve the suffering of mankind. There were 1,500,000 pounds used in the Northern Army alone, during the Civil War.

See Anæsthetic.

Chlorophyceæ (*klō-rō-fĭs'ē-ē*), plants known as the green algæ, which are abundant everywhere in fresh waters and in damp places, and are of special interest in connection with the evolution of the higher plants. Some of the forms are one-celled occurring in masses which cover damp tree trunks, and stones, and look like a green stain. Others have filamentous bodies composed of a row of cells more or less elongated. Still others have branched filaments. It may be said in general that the filamentous body is the usual type among green algæ. These filamentous bodies may be seen forming felt-like masses in damp places or floating as green thready scum upon the water. Various reproductive methods are developed among the green algæ. The majority of them have the characteristic asexual spores which are variously ciliated, and have the power of swimming, being known variously as the zoospores, swarm-spores, swimming spores, etc. Most of the forms also have sexual reproduction, producing a fertilized egg. Some of the forms are free-swimming; while most of them have means of anchoring themselves to firm supports. The main groups are as follows: Protococcus forms, which are one-celled and reproduce mostly by cell-division; Conferva forms, which are filamentous and produce swarm-spores as well as sexual spores; Siphon forms, as in the common green felt; and Conjugate forms, of which Spirogyra, the pond-scum is the best known. The last are called Conjugate forms because in the sexual process two filaments put out tubes toward one another, which meet and form a passageway, and through these improvised tubes the sex-cells pass. The name refers to this yoking together. It is from the green algæ that the higher plants are supposed to have come. John M. Coulter.

Chlorophyll (*klō′rō-fĭl*), the green coloring matter of plants. It is found associated with protoplasm, usually in special bodies called chloroplasts or chlorophyll bodies, which are found only in cells near the surface of parts exposed to light, *e. g.*, in leaves and twigs. These are usually rounded granules much too small to be seen with the naked eye (see Fig. I). In some algæ they are much larger, and have curious shapes. Little is known with certainty of the chemical nature of chlorophyll, because it easily decomposes. Besides the pure green coloring matter (to which the name chlorophyll may be restricted), yellow pigments (carotin or xanthophyll) are associated with it in the mosses, ferns and seed-plants. In some algæ browns or blues or reds may be present also. The green pigment particularly (and in part the others) enables the plant to absorb certain portions of the light. The energy thus gained is partly used in the making of new foods (see Photosynthesis). In the absence of chlorophyll, this work cannot be accomplished. Chlorophyll is probably being continuously produced and destroyed in green plants. It is not usually formed in darkness, and if light is excluded from a green plant the destruction of the chlorophyll leaves it a pale yellow. Autumnal colors are due in part to the decomposition of the chlorophyll.

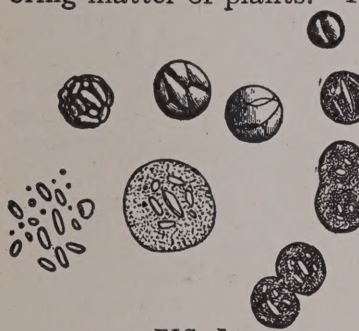
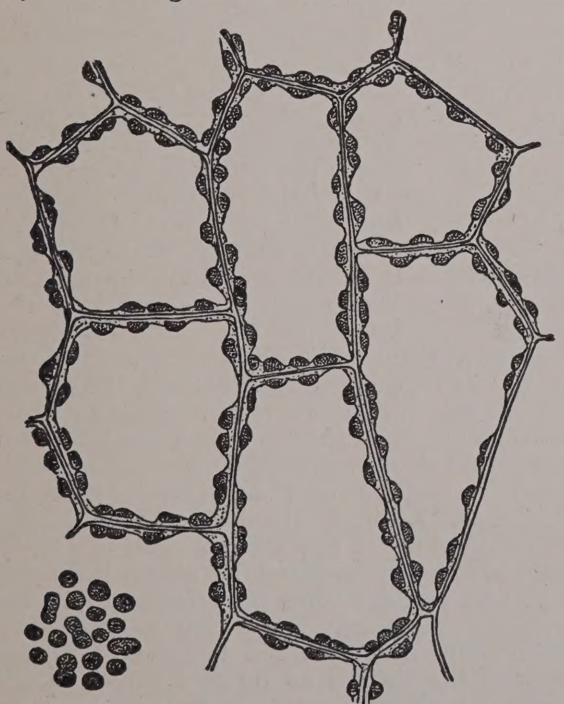
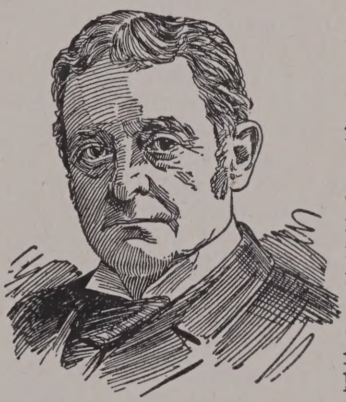


FIG. I

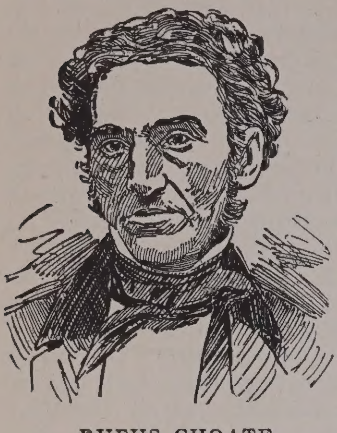

Chloroplasts: (*a*) Position in cells. (*b*) Isolated

Chloroplast (*klō′rō-plăst*), a protoplasmic body in plant cells that is stained by chlorophyll, and thus gives the characteristic green color to plants. For the work of chloroplasts see Photosynthesis.


JOSEPH H. CHOATE

Choate (*chōt*), **Joseph Hodges,** a talented and eloquent lawyer, forceful public speaker and United States ambassador to England, was born at Salem, Mass., Jan. 24, 1832. After graduating at Harvard, he adopted law as a profession, and, joining W. M. Evarts in legal practice at New York, he rose quickly to eminence, owing to his high forensic abilities and soundness as a lawyer and counselor. His chief exploits at the bar were his defense of General Fitz-John Porter, when court-martialed on a charge of disobeying orders, and his vigorous campaign against the corrupt Tweed ring in the city government of New York. In 1894 he was chairman of the convention held to revise the constitution of the state of New York. He also took part in the argument before the supreme court of the United States as to the validity of the provision as to income tax in the tariff law of 1894, the court upholding his contention that the income tax could not be collected, but leaving the remainder of the tariff law in force. Mr. Choate was a nephew of the great Rufus Choate. He was noted as a public and after-dinner speaker. In Jan., 1899 he was appointed ambassador to the court of Great Britain. He died at his home in New York City May 14, 1917.

Choate, Rufus, an American lawyer, was born at Essex, Mass., Oct. 1, 1799. He graduated at Dartmouth College, and commenced to practice law in 1823. He served as reprsentative and senator in Congress, but his greatest success was at the law. He became the foremost lawyer of New England, and undoubtedly was the first pleader of his day. His speeches and addresses show great oratorical power. He died July 13, 1859.



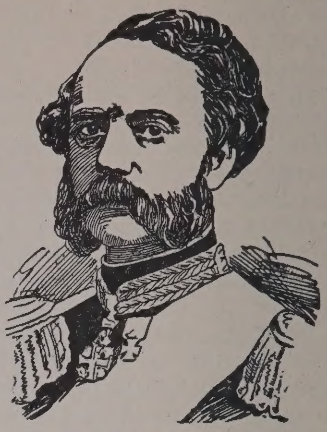
RUFUS CHOATE

Chocolate. See Cocoa.

Choctaws (*chŏk'tąz*), a widely-spread tribe of Indians, living on the shores of the Gulf of Mexico from the Mississippi to the Atlantic. They lived more by rude farming than by hunting. They are a rawboned, alert but treacherous people. The French gave them the name of Flatheads, from their practice of flattening the heads of their children with bags of sand. De Soto fought a bloody battle with them in 1540. In the wars between the French and English settlers they sided with the French; though one of their great chiefs, Red Shoes, became the friend of the English. Some 500 families moved west of the Mississippi in 1803, and the remainder were offered citizenship by the Georgians; but they preferred to trade their lands for others west of the Arkansas in Indian Territory. They were governed by a written constitution, elected a chief every four years and had a national council of 40 members and trial by jury. Under this government they advanced fast, and in 1861 numbered, with the Chickasaws, who lived with them, 25,000, and owned 5,000 slaves. In the Civil War they took sides with the south and suffered great losses. Schools and missions have been established among them for a long time. The Choctaws in the territory number a little over 10,000.

Chopin (*shō-păn'*), **Frederic Francois,** a Polish pianist and composer, was born March 1, 1809. His waltzes, mazurkas and other compositions are peculiar in melody, rhythm and harmony, and have a great charm. He was one of the first pianists, and his playing like his music, had a captivating grace. He spent most of his life in Paris, where he died Oct. 17, 1849.

Christian IX (born in 1818), was crowned King of Denmark in 1863. At his accession he was misunderstood and coldly received by the people, but by his simple manners and democratic bearing he won their respect and esteem. In 1864 Schleswig-Holstein and Lauenburg, about one third of Denmark, were taken from him by Germany. This loss of territory was offset in part by a gain in prestige through his family alliances. One of his daughters became czarina of Russia, another queen of England, one son king of Greece and another king of Norway. He died Jan. 29, 1906, and was succeeded by his eldest son who ascended the throne Jan. 30, 1906, with the title of Frederick VIII. He died of apoplexy in the streets of Hamburg, May 14, 1912. Crown Prince Christian who took the title of Christian X, succeeded him.



CHRISTIAN IX

Christian Endeavor Movement, The. This movement originated with the formation of a small society of 50 members in the Williston Church of Portland, Maine, under the direction and with the inspiration of the pastor, Dr. Francis E. Clark, on the evening of February 2, 1881. In February, 1906, after 15 years of life, the movement showed 66,000 societies, with 4,000,000 members, found not only in the United States, but in Canada and Great Britain, in many countries of Europe, in India, China and Japan, in Australia and in Africa. The different societies are independent, united only by a community of principle and plan. There is, however, a corporation, bearing the title of United Society of Christian Endeavor, of which Dr. Clark is chairman. This society collects and distributes the funds that may be sent to it, and seeks to promote in every way the movement. Most of the societies have a constitution that declares the purpose to be "to promote an earnest Christian life among its members, to promote their mutual acquaintance and to make them more useful servants of God." There are active members and associate members. The former bind themselves to attend every meeting of the society to which they belong, unless prevented by absolute necessity, and to take some part, however slight, in every meeting. They are to read the Bible daily and to assist the pastor in the work of the church as he shall direct. The society is interdenominational. A special feature of the society has always been the appointment of many committees to attend to and systematize various aspects of church work. Conventions are held every year in different parts of the United States. Similar conventions are held in foreign countries. The World's Christian Endeavor Union has been formed, and the Society in America publishes a journal, *The Christian Endeavor World.*

Christian Era, the great era, now almost universally accepted, especially in Christian countries, for the computation of time. It is commonly held to correspond to the date of the birth of Christ; but this is scarcely accurate, since that epochal event took place four years before the era now accepted as the commencement of the new epoch in reckoning time. The centuries before the advent of Christ are marked B. C. (before Christ); those that follow are marked A. D. (*anno Domini*). The era is computed from Jan. 1 in the 4th year of the 194th Olympiad; the 753d from the foundation of Rome; and the 4,714th of the Julian period. The new epoch was introduced in Italy in the 16th century, and came into use in England some centuries later.

Christian Science. See EDDY, MARY BAKER.

Christiania, capital of Norway, was named after Christian IV, who began to build the city in 1624. The national parliament, the storthing, with its two houses, the Lagting and the Odelting, meets here. It has a large university, a fine observatory, two palaces of the king of Norway and a national picture-gallery. An interesting establishment in vogue here is the Steam Kitchen, which provides good and cheap dinners for working people. The great industry is its shipping trade, both foreign and coasting. Its chief exports are of timber and fish. Population, 241,834.

Christina (*krĭs-tē′nä*), queen of Sweden, the only child of the great Gustavus Adolphus, was born Dec. 17, 1626. She succeeded her father when only six years old. Beautiful and brilliant, she was given the schooling then only given to men. She took the ruling power into her own hands in 1644, and six years later, in accordance with her mannish desires, was crowned king instead of queen. She ruled ably for the next four years, but her wayward restlessness could not brook longer the restraints on her personal action which her position of queen made her keep, and she resigned the throne in favor of her cousin Charles, reserving, however, authority over her own household. At this time, when but 28 years old, she traveled over Europe somewhat like a female knight-errant, now becoming very religious at Brussels, now entering Rome on horseback dressed as an amazon, and later shocking Paris by having her grand equerry put to death in her own household for treason. Tired of this wandering life, she thought the death of Charles a good chance to become queen again. But in this she failed. She died at Rome, April 19, 1689.

Christmas (*krĭs′mas*), the day on which the birth of Jesus Christ is observed. The first certain traces of the festival are found about the time of the Emperor Commodus (180–192 A. D.). In the reign of Diocletian a churchful of Christians, gathered to celebrate Christmas, were burned by order of the emperor. The birth was celebrated in May, April and January by the early Christians. It is almost certain that the 25th of December is not Christ's birthday, as it is the rainy season in Judæa, and shepherds could hardly be watching their flocks by night in the plains at that time. The present date came to be used probably because all heathen nations celebrated that season with great festivities, as the old Norse Yule-feast. The beautiful Christmas carols at first were manger-songs, telling the story of Christ's birth. The Christmas-tree with its hanging toys was a custom borrowed from the Romans, and is told about by the poet Vergil. The visit of Santa Claus bearing gifts belongs properly to December 6, the festival of St. Nicholas.

Christmas Carol, A, the first and best of strictly Christmas stories, is one of the masterpieces of Charles Dickens. Written for the Christmas of 1843, it was marked by the best gifts of the novelist, humor, fancy, simplicity and tenderness. The old miser, Scrooge, is visited and reformed by the ghosts of Christmas past, present and future.

Chris′topher, Saint, according to the old story, lived in Syria, and was put to death as a martyr by the Emperor Decius. He is said to have been 12 feet in height and of great strength. In the pride of his strength, he would serve only the mightiest upon earth. Once he served a powerful king for a while; but seeing his master's fear of the devil, he at once became the devil's servant. But one day he saw the devil trembling before an image of Christ, and decided to serve Christ only. As punishment for not having served Him before, he undertook to carry travelers across a broad stream. One day, so the the story goes, Christ came to him in the form of a little child, to be carried over, but at every step the burden grew heavier and heavier. "Wonder not, Christopher," said the child, "for with Me thou hast borne the sins of all the world."

Christ's Hospital, a noted school in London, England, with an ancient foundation. It was founded by Edward VI in 1553, as a hospital for orphans. It is usually called the Blue-coat School, from the odd dress worn by the boys. About

30 years ago the cap and petticoat were discarded, but otherwise the garb or uniform is the same to-day as that worn in the 16th century: a blue coat with a red girdle round the waist, knee-breeches, yellow petticoat and stockings, a clergyman's bands at the neck and a small blue worsted cap. Coleridge, Lamb, Sir Henry Maine and other prominent men were educated here.

Chron′ograph, an instrument, of delicate mechanism, for measuring and recording minute portions of time. It is used by astronomers for registering the instant occurrence of an astronomical event, directly it happens and is visible. It is also used at horse-races, to record the starting of a race and the instant each horse in the contest passes the winning-post. The chronograph usually registers to one tenth of a second; the delicate records are made by electro-magnetism, and can be brought into action or stopped at any instant through the manipulation of an electric key by the finger. Of this type is the chronograph known as Schultze's, which is so precise and delicate that it can register time to the 500,000th part of a second. Of the ordinary type of chronometer is Benson's which, in principle, is a lever-watch, with a double seconds-hand, the one superimposed on the other. The one in use by astronomers is Strange's, which is connected with the pendulum of an astronomical clock, and makes a dot or other mark on a sheet of paper at the beginning and end of each swing of the pendulum.

Chronometer. See Clock.

Chrysan′themum (meaning golden flower), is a flower growing in the temperate parts of Asia, Europe and North America. There are many varieties, such as the ox-eye daisy, corn marigold, golden feather and marguerites. The most popular variety in our gardens and flower-markets was highly esteemed in China long before it was known in Europe, and gives its name to the Chinese order of honor, the Order of the Golden Flower. It was brought to Europe in 1764, and now there are many hundred varieties. The colors are very various and beautiful. It is popular also because it flowers during the late autumn months. The cultivation of the chrysanthemum and the developing of new varieties have been very much extended in the last few years. Chrysanthemum shows are usually held in all our large cities.

Chryseis, the daughter of Chryses, a priest of Apollo, had, according to the story of the Trojan War, been one of the captives of Achilles. In the partition of the booty she fell to Agamemnon, who refused her father's offer of ransom. Apollo avenged the insult by visiting the Greek army with a plague, until Agamemnon, its leader, was compelled to restore Chryseis to her father.

Chrysostom (*krĭs′ŏs-tŏm*), **John, Saint** (meaning "golden mouthed"), was born at Antioch about 347 A. D. His mother was a pious woman and devoted herself to her son, who grew into an earnest, gentle and serious young man. He studied, became a monk and spent much time in preaching, in which he was very successful. His eloquence caught the attention alike of Jews and heathen, and gained him the reputation of the greatest orator of the ancient church. Appointed to an important office in Constantinople, he pared down the cost of living and gave what was saved to charities, so that he was called John the Almoner. For trying to reform the lives of some of the monks about him, he was banished to the Taurus Mountains. Even here he could not keep silent, but began to preach to the Persians and Goths in the neighborhood and to write *Letters* and *Homilies*, or explanations of parts of the Bible, which to-day are in the front rank of the literature of the church. But another order came to banish the golden-tongued preacher to the most distant corner of the Eastern empire. So the old man was made to travel on foot and with his bare head exposed to the burning sun. This was more than he could bear, and he died on the way, Sept. 4, 407 A. D.

Chuquisaca (*chōō′kē-sä′kȧ*) or **Sucre,** the capital of Bolivia, is built on a tableland almost 9,000 feet above the sea, shut in by mountains. It has a large cathedral and a college. Its citizens are mostly a mixture of Spaniards with Indians. Population, 23,416. Chuquisaca is also a department of the republic; area 26,400 square miles; population about 237,143, consisting of Indians, Mestizos and whites.

Church, Frederick Edwin, a celebrated American landscape-painter, was born at Hartford, Conn., May 4, 1826. He first painted scenes from the Catskill Mountains. He then traveled in South America, and painted his *Heart of the Andes*, *Morning on the Cordilleras*, etc. He also made a sketching trip to Greece and Palestine. His *Tropical Scenery* and *View of Niagara Falls from the Canadian Shore* are among his best works. He died in 1900.

Church-Councils. Church-councils are of two kinds, general or œcumenical councils, at which the whole church is represented, and others, in which some division of the church, as a sect or a local division, is represented. The council may meet to discuss matters of doctrine or matters of discipline. Some councils consist of clerical members only; others admit lay members, that is, those who have not been ordained. The latter are more common in Protestant churches. The lesser councils are too numerous to mention, occurring in connection with every sect. The œcumenical councils were held before the division of the church (about 800 A. D.) into the Eastern and the Western church. The first was held at Nicæa, in Asia Minor, 325 A. D., under the Emperor Constantine. It was in that council that Athanasius won the victory for the doctrine of the trinity, against the unitarians under Arius. The next councils were those of Constantinople (381), Ephesus (431), Chalcedon (451), Constantinople (553), Constantinople (680), Nicæa (787). The Greek or Eastern church recognizes only these as general, because it did not attend the rest; but the Roman church considers the following to be general, holding that the other churches are not real churches, that there is but one church, the Roman Catholic: Constantinople (869), Lateran (1123), Lateran (1139), Lateran (1179), Lateran (1215), Lyons (1245), Lyons (1274), Vienne (1311), Constance (1414), Basel (1431), Florence (1438), Lateran (1512), Trent (1545), and Vatican (1869). The authority of the councils has given way to that of the pope, especially since the council of Trent. At the last council, the Vatican, membership was limited to cardinals, bishops, mitred abbots and generals of religious orders.

Churchill, Randolph Henry Spencer, Lord, an English statesman, member of Parliament and second son of the sixth Duke of Marlborough, was born in 1849, and died in 1895. In 1874, on a visit to this country, he married Jennie, daughter of the late Leonard Jerome of New York. In the same year he entered the British Parliament, and later on became a versatile and often audacious speaker, the life and soul of what was then known as the Fourth Party in the chamber. He subsequently became one of the leaders of the Conservative party, and was recognized as a new and powerful, if at times somewhat erratic, political force. He took a prominent part in the Bradlaugh debates, and when Mr. Gladstone fell and Lord Salisbury came into power, Lord Randolph Churchill was appointed chancellor of the exchequer and leader in the commons. In Dec., 1886, differences with his colleagues led to his resignation. He again (in 1892) became a member of Parliament. He died at London, January 24, 1895.

Churchill River, 1,000 miles long, flowing into west shore of Hudson Bay near Fort Churchill in the District of Keewatin (Canada). Direction northeasterly.

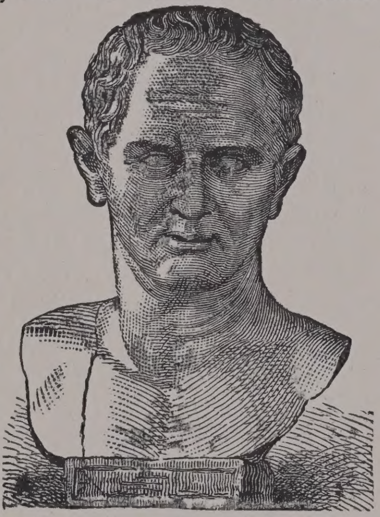
Churchill, Winston, American novelist and contributor to magazines, was born at St. Louis, Mo., Nov. 10, 1871, and graduated in 1894 from the United States Naval Academy. For a time he was editor of the *Army and Navy Journal*, of New York, and managing editor of *The Cosmopolitan*. He has published a number of short naval stories and character sketches of naval officers; an account of the naval battle of Santiago; and several notable novels, dealing powerfully with important eras in American history. These stories include *The Celebrity*, *Richard Carvel* and *The Crisis*, the latter a story of the Civil War.

Later works are *The Crossing*, a love story entitled *Coniston*, *Mr. Crewe's Career*, *A Modern Chronicle* and *The Inside of the Cup*.

Churchill, Winston Leonard Spencer, son of the late Lord Randolph Churchill, English Parliamentary Under-Secretary for the colonies, under Campbell-Bannerman, and first lord of the admiralty under Asquith, was born November 30, 1874, and educated at Harrow and the military school at Sandhurst. In 1895 he entered the army, and saw considerable fighting, and was in many active expeditions in different parts of the world. He first served with the Spanish forces in Cuba; then in India; and later in the Nile expeditionary force in Egypt, and for his services at Khartum received a medal and clasp. Toward the close of 1899 he proceeded to South Africa, and was taken prisoner by the Boers, while acting as war-correspondent. He afterward escaped from custody at Pretoria, and proceeding to Cape Colony he joined the South African Light Horse as lieutenant. With this body of troops he saw much service in the colony, was in many hot engagements and was present at the taking and occupying of Pretoria by Lord Roberts in June, 1900. He remained first Lord of the Admiralty until after the outbreak of the European War but was replaced in that office in 1915 by Arthur J. Balfour on the formation of a coalition ministry under Asquith (*q. v.*). His publications embrace *The Story of the Malakand Field-Force; Savrola* (a novel); *The River War*, an historical account of the reconquest of the Sudan; *London to Ladysmith via Pretoria;* and the narrative of *Ian Hamilton's March.* He has also written a *Life of Lord Randolph Churchill*, his father, which is regarded as a fine piece of biographical literature and *My African Journey*. See Scott's *Winston Spencer Churchill.*

Churubusco (*chōō′rŏŏ-bōōs′kō̆*), a village six miles south of the City of Mexico, where was fought a battle between the Americans, under General Scott, and the Mexicans under General Santa Anna, Aug. 20, 1847. The road to Mexico is a high, paved causeway crossing the River Churubusco by a stone-bridge. At this point on the high river-banks Santa Anna made a stand, to arrest Scott's advance to the capital. Scott had won the battle of the Contreras the same day, and he carried the Churubusco position after smart fighting, with a loss in both actions of 1,065; Mexican loss, including prisoners, 7,000, besides artillery.

Cicada (*sĭ-kā′dȧ*), an insect improperly known as the 17-year locust. The name locust should be restricted to certain grasshoppers, which are the true locusts. The cicadas appear in great numbers at long intervals. Those of the north require 17 years for their development, those of the south 13 years. The eggs are laid in slits in twigs of trees, and are hatched after a period of six weeks. Instead of a caterpillar or grub, a nymph is produced. The latter has legs, but no wings. They drop to the ground and burrow and live by sucking the juices from the roots of trees. After 17 years they reach maturity and come to the surface. The skin splits open along the back and the perfect insect comes out. They attract attention far and near by their loud, shrill singing. Their life in this stage lasts but a few weeks. In some localities several broods overlap, which explains the fact that the insect appears in those localities more than once in the period of 17 years. The dog-day harvest-flies are also cicadas. These develop in two years, but, as there are two broods, they appear annually.


MARCUS TULLIUS CICERO

Cicero, Marcus Tullius, orator, statesman and writer, was born at the old Italian town of Arpinum, 106 B. C. In boyhood he went to Rome, and was put through a thorough and wide course of study to fit him to be an orator. Among the Romans the calling of an orator was what we would call that of a lawyer and a politician, the orator pleading law cases before the bar and speaking on political questions in the senate, thus requiring a wide and varied knowledge. In 76 B. C. he held an appointment in Sicily, where he became popular with all classes and obtained the information which enabled him, in 70 B. C., to impeach successfully the wicked governor of Sicily, Verres. This scoundrel felt himself crushed by Cicero's opening speech and fled the country. The orator had already become well known by earlier speeches, and now became a power in the state. and rose rapidly still higher. In 63 B. C., at the age of 44, he was a consul, the highest office within reach of a Roman. In the same year, by his boldness and promptness, he checkmated the dangerous conspiracy of Catiline, delivering in the senate those famous *Orations against Catiline*, which brought the senators almost to a man to his support. Cicero was now at the height of his power, but his hot eloquence had carried the senate too far. Some of Catiline's band had been put to death by a simple order of the senate. This was a stretch of power for which Cicero was held responsible, and the Father of His Country, as he had been called but a short time before, was banished and his two houses were plundered. Though the changeable people welcomed him back with shouts in the following year, he never regained power. No longer confident in himself, he halted between allegiance to Cæsar and allegiance to Pompey, and was held to be a time-server. It was a time when the old republic was crumbling to pieces, and only a strong man could build upon its ruins what would be stable and lasting. Cicero was gentle, amiable, clever and learned, but strong he certainly was not.

The later years of his life were spent chiefly in pleading at the bar and in writing essays. After Pompey's overthrow at the battle of Pharsalia, he became Cæsar's friend; but he never liked Cæsar's other friend, Mark Antony; and in the year following Cæsar's death the aged orator appeared once more in the senate, making his famous speeches against Antony, which he called *Philippics*, after the title of Demosthenes' orations against Philip of Macedon. These cost him his life. Antony's proscription-list of his enemies, who were thereby outlawed, was published, and Cicero's name was on it. Old and feeble, he fled, pursued by Antony's soldiers, and was overtaken as he was being carried in his litter down to the shore to embark. With courageous coolness he put his head out of the litter and told the murderers to strike. This was in December, 43 B. C.

Cicero as an orator stands in the first rank. Of his speeches that have come down to us, the finest perhaps are those against Verres and against Catiline. His essays on *Old Age*, *On Friendship* and *Whole Duty of Man* (de Officiis) are most pleasant reading. His letters are classics of epistolary literature. It was a remark of Erasmus: "I feel a better man for reading Cicero."

Cid (*sĭd*), **The,** the name given to Rodrigo Diaz, a famous warrior of Spain, who was born about 1040. He was commander of the army of Sancho II, king of Castile, in the wars in which that king tore Leon and Galicia from his brothers. Sancho was killed treacherously during a siege, and Alfonso, the banished king of Leon, became king. The Cid was soon afterward banished himself, and with a motley following he offered his services to the king of Saragossa and fought ably against his enemies. After besieging Valencia on his own account for years, he conquered the city, and reigned over the district until his death, five years later, in 1099. He appears to have been a bold and able soldier and a born leader of men. These adventures and many other things which he never did are told in the *Cid Poem*, written in the 12th century, probably the oldest literature in the Spanish language. The story of the Cid was told by the storytellers who wandered over the country, welcomed at every castle, where they enlivened the long evenings by telling stories of the national heroes, after making up adventures which they tacked on to the lives of such men as Charlemagne and the Cid. It was from these stories that the poem, with other chronicles and ballads about him, was made. On this story Corneille based his *Le Cid* and Southey his *Chronicle of the Cid.*

Cider is the fermented juice of apples. Usually, apples that are sour in taste are used, and late apples make better cider than early ones. The apples after gathering are left to mellow for some days. The juice is crushed out by passing the apples between fluted rollers or in mills of various kinds. The pulp is placed in bags or in wicker-work frames with holes, and the juice is drained into tubs. This juice is kept for the finest quality of cider. The rest is squeezed out in a press. This pressure, especially where unduly great, adds juice from the pipe and skins and gives it a coarser flavor, though in larger quantity. Eight to ten days' fermentation takes place in casks with large bungholes, the vinegary yeast frothing to the top, which is constantly removed. The cider is next freed of the sediment by being placed in fresh casks, and this is repeated in the spring. Champagne cider is made by bottling the juice before it is fully fermented. Cider contains from four to ten *per cent.* of alcohol.

Cienfuegos (*sē'ĕn-fwā'gôs*), a city of Cuba, is in Santa Clara province on the southern side of the island. Its harbor was discovered by Columbus in 1492, and is one of the finest harbors in the West Indies. The port's commercial advance in recent years has been so rapid that Cienfuegos has become the second seaport in Cuba. To-day it is the center of the sugar-trade on the Caribbean coast. The city has well-shaded, attractive streets, its residences are substantially built, and it is lighted by gas and electricity. The climate in summer is oppressive, but the winter climate agreeable. Railroads connect Cienfuegos with Havana and Sagua la Grande on the northern coast and with Santa Clara, the western terminus of the Santiago railway. Steamers give communication with New York. The population is 70,416. During the Spanish-American war the port was long blockaded by the American fleet.

Cimabue (*chē'mȧ-bōō'ȧ*), **Giovanni,** an Italian painter, was born at Florence in 1240. The art of painting had in his day fallen into decay, and Cimabue's attempt to follow nature, painting from a living model, was called "a new thing in these times." His two madonnas are still preserved in Florence, but he is best known as the teacher of Giotto and as the founder of the Florentine school of painters which included Michael Angelo and Raphael. He died about 1302.

Cimbri (*sĭm'brī*), a people who, together with the Teutons, came out of the north of Germany, and moving southward fought against the Romans in 113 B. C. At first victorious, they were prevented from ravaging Italy by Marius, who routed them in a battle near Verona in 101 B. C. In this battle they showed the greatest courage, even the women killing themselves and their children when they saw that all was lost. Years later, Cæsar and Tacitus speak of the Cimbri, who appear to have lived, a few in number, in the far north of Germany. They probably belonged to the German race.

Cimon (*sī'mŭn*), an Athenian commander, was the son of Miltiades, the conqueror at Marathon. At the time of the Persian War he was made one of the two commanders of the Athenian section of the Greek navy, commanded by the Spartan, Pausanias. His greatest encounter was in 466 B. C., with a Persian fleet of 350 ships at the River Eurymedon, when he destroyed or captured 300 vessels and also defeated the Persian land-force on the same day. He became very popular in Athens, but later was opposed by Pericles and the democracy and banished, though he was recalled in five years. He died during one of his sieges, in 449 B. C.

Cincinnati (*sĭn'sĭn-nä'tĭ*), the second largest city of Ohio and tenth in rank in the United States, is situated on the Ohio River in the southwest part of the state. It is built upon two terraces, the first 60 feet and the second 112 feet above the river, surrounded by a circle of hills, about 450 feet high, forming one of the most beautiful amphitheaters on the continent. The city embraces nearly 72 square miles, extending along the Ohio River for about 15 miles. The city and its suburbs cover the surrounding hills, which are reached by a series of street-railways with inclined planes, one having a height of 275 feet. Cincinnati is noted for the beauty of its suburbs, which stretch for miles in all directions, with costly residences and large and ornamental grounds. The suspension bridge between Cincinnati and Covington is 2,252 feet in length, and was built at a cost of $2,000,000. There are 18 parks and a zoological garden; Eden park, covering 215 acres, and Mt. Airy Forest, with 795 acres, being the largest. Of the 21 cemeteries, the largest is Spring Grove, containing 600 acres, and said by travelers to be the most picturesque cemetery in the world. The Tyler-Davidson fountain, a bronze fountain cast in Munich at a cost of $200,000, was the gift of a private citizen, and is one of the ornaments of the city. Among buildings of note are the hospital, erected at a cost of $4,000,000; the cathedral, with a stone-spire 224 feet high; the Masonic temple, the Art museum in Eden Park, the Gibson and Sinton hotels, Ingall's building, the great Exposition building and Music hall with its noted grand organ.

Cincinnati is an important commercial and manufacturing city, and, since 1870, a port of entry. It for many years was the leading city of the west, called the Queen City. Its trade in pork was the largest in the country until 1863. Its manufactures are numerous and extensive, especially in iron, leather, shoes, paper, soap and carriages. Cincinnati has always been noted for its interest in literary and educational matters, and it also has a wide reputation as an art and musical center. The Cincinnati University, with 500 instructors and 5,000 students, Lane Theological Seminary, medical and law schools, the art-school and museum, a free school of design, a free public library, mercantile library and historical library, Emma Louise Schmidlapp Memorial Library, and the Lloyd Library, devoted to botany and pharmacy, are among its many institutions. Its great school of wood-carving and the Rookwood pottery are each celebrated. The ware from this pottery ranks with the art-product of the most famous potteries of the Old World, and may be found in the best private collections on both sides of the Atlantic.

Cincinnati was permanently settled in 1788, and named in honor of the Society of the Cincinnati. The river trade, which began with the arrival of the first steamboat in 1811, gave it its early importance. It became a city in 1819. In 1845 the first railroad entered the city. The population is largely foreign, one entire part of the city, called "Over the Rhine," being German. Population, 450,000.

Cincinnati, Society of the, a society of officers of the Revolutionary army, organized at the close of the war to keep up friendships and especially to raise a fund for widows and orphans of their comrades who had lost their lives in the war. It was named from the old Roman hero, Cincinnatus, as many of the members had similarly left their farms at the call to arms. As membership was made to descend from father to son, an outcry was made against the society by Franklin and others, who saw in it the germ of a future aristocracy. This caused some of the branches to disband. But there still are several state societies in active existence.

Cincinnatus (*sĭn′sĭn-nā′tus*), **Lucius Quintius,** was made consul of Rome in 460 B. C. When the messengers came to tell him of his election, they found him ploughing on his small farm. Two years later he was made dictator. The barbarous Æqui had surrounded the consul Lucius Minucius and defeated him. Cincinnatus marched to his aid and rescued him. Sixteen days later he laid down the unlimited power of the dictatorship and went back contentedly to his small farm on the Tiber. At the age of 80 he was again made dictator. He was a favorite hero among the later Romans, who looked on him as a model of goodness and simple manners.

Cinematograph (*sĭn′ĕ-măt′ŏ-grăf*). This is an instrument which casts upon a screen a number of successive views which have been taken from a moving object, in so swift an order that the eye does not observe that the picture has been changed. The spectator appears to behold one and the same view, in which the objects are in actual motion. On an average about 100,000 pictures are needed for an exhibition which is to last one hour. The instrument was invented in 1894 by Edison.

Cinnamon. See SPICES.

Circas′sians, the name sometimes given to all the formerly independent peoples of the Caucasus, more strictly to the tribes living in the northwest wing. The Circassians are a handsome race, their girls being the most beautiful in the Turkish harems. They also are strong, brave and temperate. For years they struggled fiercely agianst Russia, to keep their independence, and in 1858–65, rather than submit, nearly the whole nation of 15 tribes, about half a million in number, left their country for the Turkish part of Asia Minor or the mountains of Bulgaria. See CAUCASUS.

Cir′ce, a sorceress about whom Homer tells us in his *Odyssey*. Round her palace in Ææa were many men and women whom she had changed into the shapes of lions and wolves by her drugs and charms. Twenty-two of Ulysses' companions she changed into swine, but Ulysses himself was given an herb, which protected him. So he went boldly to her palace, was unhurt by her drugs and persuaded her to disenchant his companions. She also taught him how to escape many dangers on his homeward voyage. Another story about Circe is that she poured the juice of poisonous herbs into that part of the sea where Scylla, of whom she was jealous, was accustomed to bathe, and so changed her into a horrid monster.

Circulation of Blood, the course of the blood in its round from the heart back again. A simple case of circulation is illustrated in the crayfish, where the heart consists of a single chamber with muscular walls. When it contracts, the blood is sent, in arteries, forward, backward and downward; on its return path it passes through the gills. In the clam there is a two-chambered heart. In fishes there are two chambers; in frogs and toads three; in the highest reptiles and all birds and mammals four chambers in the heart. The ancients believed that the arteries contained air, and only the veins blood. Galen (131–200), in the 2d century, demonstrated that both arteries and veins contain blood, but a direct connection between the two was not thought of. In the 16th century such a connection was believed in by Vesalius and others. In 1628 William Harvey published a book in which he maintained that the quantity of blood leaving the heart and the rate at which it leaves made a return to the heart necessary. This marks an epoch in physiology. He did not, however, see the minute vessels connecting arteries and veins. It remained for Malpighi, in 1661, and Leeuwenhoek, in 1669, to demonstrate, with the microscope, the existence of minute tubes connecting arteries and veins, and thus to show that the circulation takes place in a series of closed tubes. For further facts regarding circulation see HEART.

Cir'cus, in Roman usage, was a large, oblong building, used for chariot and horse-races, athletic exercises and wild-beast fights. According to tradition, circuses originated with Romulus, and subsequently these games became popular, and several buildings were put up for their use, the largest being called the Circus Maximus. This was enlarged several times, and is reported to have held from 150,000 to 385,000 persons. In the time of Julius Cæsar it was 1,875 feet in length and 625 feet wide. It was oblong in form, rounded at one end and square at the other, with tiers of stone seats on the sides and curved end, while at the square end were stalls for the horses and chariots. The Romans were very fond of the chariot-race. Usually, four chariots raced seven times round the circuit. Boxing, wrestling and even battles were engaged in. Canals were also dug and sea-fights shown. Animals were brought from as far as Asia and Africa. Free shows were given by politicians to curry favor with the people. Pompey gave a five days' circus, during which 500 lions and 20 elephants were killed. Often the Romans would demand bread and circus-games from candidates for office.

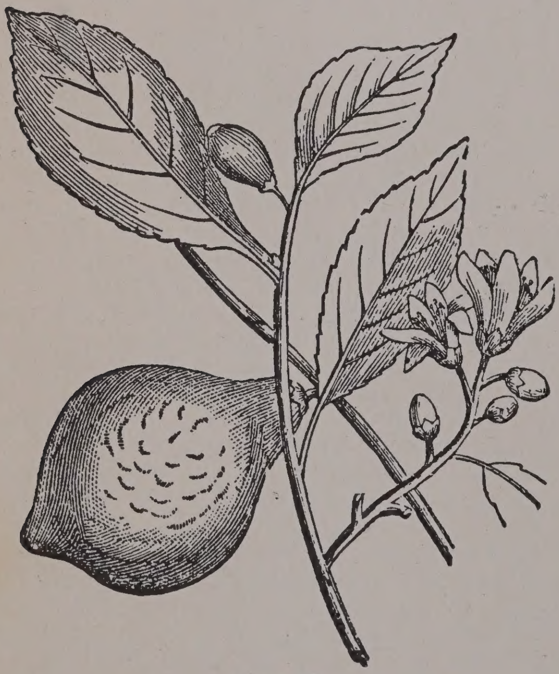
Citizenship. The term citizen implies membership in a political community, and involves on the one side his allegiance to and support of that community, and on the other the protection of the citizen by the community. It does not imply the right to vote or to hold office. These privileges may be and often are withheld from citizens, while granted to those who are not citizens. This modern use of the term citizen must be contrasted with the original use, which prevailed among the Greeks, and which is thus defined by Aristotle: A citizen is one who has the right to take part in both the deliberative and judicial proceedings of the community of which he is a member. Our idea of citizen is related to that of subject, as that term was used in England when this country separated itself from England; for a subject meant one who owes allegiance to the king and demands protection from him. The country with us takes the place of the king, — that is the difference. By the original constitution of the United States it was left uncertain whether citizenship related in the first place to the state and only secondarily to the nation, or *vice versa.* The fourteenth amendment, passed by Congress in 1866, approved by the requisite number of states and proclaimed law in 1868, decrees that all persons born or naturalized in the United States and subject to the jurisdiction thereof, are citizens of the United States and of the state wherein they reside. This made national citizenship fundamental, and declared that state citizenship follows from it. Those living in territories and the District of Columbia are not citizens of any state, though they may be citizens of the United States.

Citizenship does not rest on descent, fundamentally, but on the fact of birth on the soil of the United States. A person born of alien parents on the soil of the United States, unless he reserves allegiance to the country of his parents, is a citizen. Exceptions are Indians not taxed and persons born in the Philippine Islands until they shall be declared a territory (Supreme Court decision, May 1901). Citizenship is *extended* to those born abroad of a father who is a citizen, and to an alien woman married to a citizen (Acts of Congress, April, 1802, and Feb., 1855). The third extension of citizenship is to naturalized persons. To be naturalized the alien must have declared his intention to become a *bona fide* citizen at least two years before admission, must have resided in this country five years, and must swear that he does not believe in polygamy or disbelieve in organized government. He must speak English. An alien landing before he is 18 may be naturalized at 23 without a previous declaration of intention. The fourth extension is to one whose father is an alien, and who himself was born abroad, but who is under 21 and resides in this country when his father is naturalized.

Citizenship does not give the right of suffrage, and suffrage may be conferred without citizenship. To prevent the levy of reckless taxation, propertyless citizens are in some states deprived of a vote; while on the other hand many states extend the right to vote to those who have not yet become citizens, but have declared their intention to do so. The fourteenth and fifteenth amendments do not require that citizens be permitted to vote. The fourteenth amendment declares that what privileges and immunities citizens possess by the laws of the state and the nation shall not be abridged. But voting is not such a privilege. The fifteenth amendment simply declares that, whatever limitation the state may impose in the matter of voting, it shall not be based on "race, color or previous condition of servitude."

In ancient states the right to trade and to the protection of the laws rested upon citizenship. But this rule does not prevail in modern civilized states. Citizenship also means membership in a city, and then largely refers to the rights that follow from the fact of being taxed. The member of any republic, as that of France, is called a citizen. A British subject also styles himself a British citizen, because of the democratic basis of his government.

Cit′ron, the fruit of a species of *Citrus* (*C. medica*), a genus of the rue family, to which belong also the orange and lemon. The citron is a large lemon-like fruit with a thick rind, which is used in the making of preserves. Citron cultivation in the United States is chiefly developed in Florida and California.

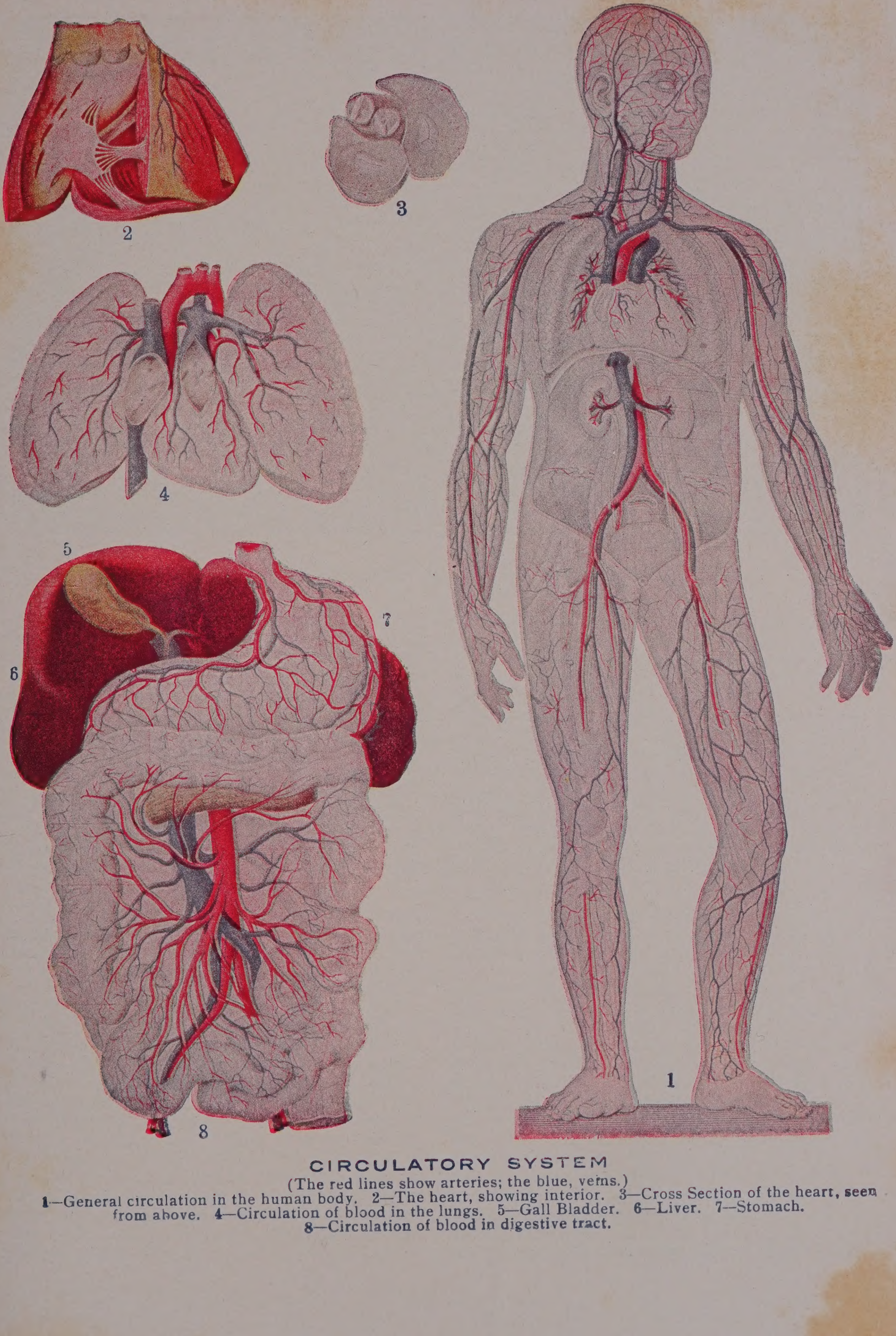


CITRON

Citrullus (*sĭ-trŭl′ŭs*). A genus of plants of the gourd family, which includes the watermelon (*C. vulgaris*). The three species are widely distributed in Africa, the melon belonging to tropical and southern Africa. One of the species (*C. colocynthis*) from the Mediterranean region yields colocynth, a drug obtained as an extract from the fruit.

Civil Service is the executive branch or department of government, composed of those who serve the state or crown in a civil capacity, as opposed to those employed in the military and naval services. In England it is one of the oldest institutions of the country, dating from the earliest monarchical times, though it is only within the past century that the English civil service has assumed its present vast proportions. In this country, as in all enlightened states, the civil service branch of government is usually separated into three distinct departments, viz.: the legislative, judicial and executive branches. In the United States the divisions of the executive civil service are—the departmental service, the customs service, the postal service, the government-printing service and the internal-revenue service. The number of positions in the United States executive civil service is now close upon 330,000, of which more than half are classified competitive positions, and all employed are under civil-service rules, prescribed by act of Congress in 1883. That act authorized the president to appoint three civil service commissioners to regulate and improve the service, to make regulations to govern the examinations and to investigate and report upon all matters touching the enforcement and effect of the rules and regulations. The purpose of the law and its governing rules is to establish, in the parts of the service within their provisions, a merit-system whereby selections for appointments shall be made upon the basis of demonstrated relative fitness without regard to political or other considerations. To carry out this purpose a plan of competitive examinations is prescribed, and, when vacancies occur, the appointee is drawn from the eligibles of the highest grade on the appropriate register; and every appointment is made at first for a probationary period of six months. It has to be added that there are what are known as preference claimants, viz.: persons who have served in the military or naval service of the United States, and were discharged by reason of disabilities resulting from wounds or sickness incurred in the line of duty. Such are released from all maximum-age limitations; are eligible for appointment at a grade of 65, while all others are obliged to obtain a grade of 70; and are certified to appointing officers before all others. Cities and states have also adopted civil service methods.

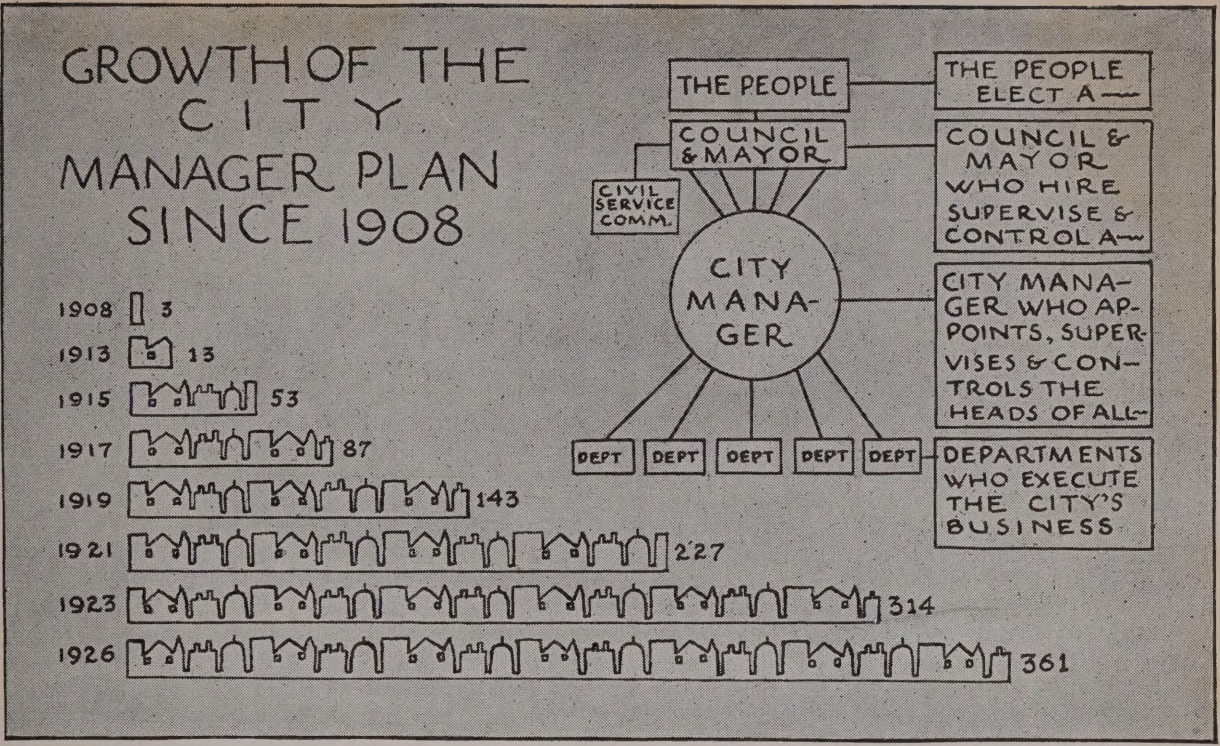
Civil War, The. See United States.



CIRCULATORY SYSTEM

(The red lines show arteries; the blue, veins.)

1—General circulation in the human body. 2—The heart, showing interior. 3—Cross Section of the heart, seen from above. 4—Circulation of blood in the lungs. 5—Gall Bladder. 6—Liver. 7—Stomach. 8—Circulation of blood in digestive tract.



GROWTH AND OPERATION OF THE CITY MANAGER PLAN

City Manager Plan. More than half the people of the United States live in cities. Some 60,000,000 people, therefore, are interested in having efficient city governments. In 1926, 361 cities were operating under the city manager plan of government. In general the citizens elect a council and mayor, who appoint a city manager subject to their will. Advocates assert the plan is more efficient, as under its operation executives hold office through merit, not politics, and that the plan is democratic because the people choose a council and mayor who are accountable. Staunton, Va., in financial difficulties in 1908, considered running its affairs on a strictly business plan. Galveston, Texas, had restored itself quickly after the flood by a form of arbitrary rule. The citizens of Staunton evolved a satisfactory type of city manager plan. Later, Lockport, New York, drew a plan of city management widely known as the "Lockport Plan" which, though never adopted, became the basis for other systems. In 1912 Sumter, S.C., adopted features of the Staunton and Lockport plans, and was the first city to call the executive "city manager." Cleveland is the largest city governed by a city manager. There are over 360 cities in the U. S. so governed.

Clam, the name applied to the freshwater mussel and similar animals living in salt water. They have bivalve shells, held closed by muscles and open by a springy ligament on the back of the shell; therefore, the shell of a dead clam always stands open. They creep through the mud and sand of the bottom by means of a fleshy foot. A current of water is drawn through a tube and is strained through the plate-like gills; it then passes into a chamber in the body and out by another tube. The food consists of minute animals and organic matter in the water. This is separated by straining the water through the gills, and is carried to the mouth by the movement of small hair-like projections or cilia. The shell is secreted by glands in the mouth, which covers the body, and is enlarged by rings as the animal grows.

Clan (meaning children), a name given to men banded together because of having a common ancestor or because of any other tie; but the word almost always means the divisions of the Scottish Highlanders. The clan was made up of men dwelling together or having a common surname. The affix *Mac* (meaning son) was a common one among Scottish Gaels: the Macdonalds were the sons of Donald. Clans which could find no security were called broken clans; their members were outlaws, and might be hunted down like wild beasts. The McGregors were a noted broken clan; their name was proscribed, and clansmen who wished to live peaceably in the lowlands, changed it slightly, calling themselves Gergor, Gergory, Grierson, etc. Clan names were kept up, as a reminder of past times, long after governmental methods by the tribal system had died out. The Scottish rebellions of 1715 and 1745 induced the British government to suppress or break up the connection that existed between the clansmen and their tribal or family chiefs.

Clar'endon, Edward Hyde, Earl of, historian and statesman, was born Feb. 18, 1608, at Dinton, England. When young, he had such gay companions as Ben Jonson and his lifelong friend, Falkland, and, as he himself said: "He never thought himself so good a man as when he was the worst in the company." As a member of the short and long parliaments he sided against the king, Charles I, but in 1641 drew back and thenceforth supported Charles, composing his answer to the Grand Remonstrance and advising him in the troublous times which followed.

Under Charles II he was high chancellor. His efforts were directed to the restoring of the kingdom to the condition of things which existed 20 years earlier. He looked with equal sourness on Charles' vices and religious toleration, displeased Cavalier and Puritan alike, and was blamed for the sale of the fortress of Dunkirk to France and even with the Great Fire and the Great Plague. Impeached for high treason, in 1667, he spent the remainder of his life in exile. His *History of the Rebellion in England* is an apology for the course of himself and Charles I, rather than a fair and impartial history. He died in France in 1674.

Clarendon, George William Frederick Villiers, Earl of, an English diplomatist, was born in London, Jan. 12, 1800. He was a man of genius and charming manners, of rare tact and perfect temper, qualities which insured his success in the diplomatic service, in which he became distinguished. As ambassador to Spain, in 1833, he used the large influence which he soon gained in helping Espartero to establish the government of Spain on a constitutional basis. In 1847 he became lord-lieutenant of Ireland, where he had a rebellion and a famine to contend with. In 1853 he was placed at the head of the foreign office, and upon him fell the responsibility of the Crimean War and at its close the negotiations in regard to the balance of power in Europe. He died on June 27, 1870.

Clarinet (*klăr-ĭ'-nĕt*) or **Clarionet,** a wind-instrument, usually of wood, in which the sound is made by a single thin reed. It was probably invented by Joseph Denner, of Nuremberg, in 1690; but it has since then been much changed and improved, so that it now is one of the best of wind-instruments. The tube is round, and enlarged at the end in the form of a bell. It has holes to be covered by the fingers and left thumb, and keys, usually 13, to give the extra tones. The mouthpiece is flattened on one side, along which the reed is laid, leaving a slight opening so that when blown the reed vibrates against the mouthpiece and thus causes the sound. The clarinet has a much greater compass than the flute. It is used in orchestras and is the leading instrument in military bands.

Clark, Alvan, American optician, engraver and manufacturer of telescopes, at Cambridge, Mass., was born at Ashfield, Mass., March 8, 1808, and died at Cambridge, Mass., Aug. 19, 1887. Early in life he was a portrait-painter; but in 1845 he turned his attention to the making of achromatic lenses and manufacture of telescopes. Associated wtih his sons, he constructed object-glasses for universities, for the Naval observatory at Washington and for the Lick observatory in California. He also had orders for his firm from Russia, from the Imperial observatory at Pulkowa. After his death, in 1887, his two sons pursued their father's vocation, manufacturing optical instruments, making improvements in telescopes, designing models, etc. One instrument, a 40-inch telescope, they constructed at a cost of half a million dollars for the Yerkes observatory at Lake Geneva, Wisconsin. One of the sons, Alvan Graham Clark (1832–97), was also an astronomer of note.

Clark, Francis E., the founder and president of the United Society of Christian Endeavor, was born in 1851 at Aylmer, Canada. He studied at Dartmouth College and at Andover, Mass., and was pastor in Maine and South Boston. He is the author of many books, and editor of the *Christian World*. The United Society of Christian Endeavor grew out of a small Young People's Society of Christian Endeavor which he founded at Williston Church, Portland, Maine, February 2, 1881.

Clark, George Rogers. This great pioneer and soldier was born at Monticello, Va., in 1752. Previous to the Revolutionary War he had gained experience as a land-surveyor and also as an Indian-fighter. At the opening of the war he moved to Kentucky, and was returned as a member of the first legislature of Virginia, Kentucky being then part of that state. In 1778 he organized and commanded the campaign to conquer what was known as the Illinois country, the woods and prairies around the great Illinois River. He drove the French as well as English settlers from the country or compelled them to submit to the authority of the Continental Congress. He captured and, later, recaptured the fort of Kaskaskia, taking many British troops prisoners. At the end of the war he still was in possession of this vast territory. And this fact was probably the chief argument that led the English and French to extend the domain of the newly-formed nation up to and beyond the Mississippi. But for Clark it is not unlikely that the

Northwest Territory would have been handed over to England or Spain in the treaty of 1783. The legislature of Virginia created Clark a brigadier-general, and gave him 8,049 acres of land in what is now the state of Indiana, not far from Louisville. Twice he was presented with a sword. But after the war his energy led him astray. He led an unsuccessful campaign against the Wabash Indians, and tried to organize an expedition to open the Mississippi River to navigation against the authority of the Spanish, with whom we were at peace. He spent the last years of his life in poverty on the land that Virginia had granted him. He died in 1818. Clark Street, Chicago, is named in his honor.

Clark, James Beauchamp, popularly called "Champ," one of the most popular Democratic politicians of his day, was born in Kentucky in 1850. Before he became prominent in politics he worked as a farm laborer, clerk, editor and lawyer. From 1889 until his death in 1921 with the exception of four years, he served in the House of Representatives, and from 1911, to 1919 was Speaker. His great personal popularity was demonstrated in the presidential campaign of 1912; he was the leading candidate in the primary elections, but in the party convention was defeated by Wilson.

Clarke, John Hessin, distinguished American jurist, was born at Lisbon, Ohio, Sept. 18, 1857. He was graduated from Western Reserve University in 1877, and in the following year was admitted to the bar. He practiced his profession at Lisbon for two years, then removed to Youngstown, where he lived until 1897, and from 1897 to 1914 practiced at Cleveland. In 1914 he was appointed U. S. district judge for the northern district of Ohio, and in 1916 he was appointed an associate justice of the United States Supreme Court by President Wilson. In this position he served with great ability, his influence in the direction of sound law and policy being seen not only in his own decisions but in those of his colleagues. He resigned in 1922, to give the remaining years of his life to activity in behalf of the public welfare without the hampering restrictions of public office.

Clark University was founded by Jonas C. Clark in 1887, in the city of Worcester, Mass., for the purpose of promoting research by post-graduate students in scientific rather than in philosophical or literary subjects. An undergraduate department, s added (1902), of which the late Carroll). Wright, the well-known statistician, made president. In the university proper, courses are now offered in mathematics, physics, chemistry, biology, anthropology, psychology, education, economics and sociology, history and modern languages. The president is G. Stanley Hall, the psychologist, father of child-study in America, and it is in the department of psychology and education that the university has secured the most notable results. The university is unique in offering a "degree of docent," certifying to fitness, both in scholarship and teaching ability, for an academic chair or college professorship. There are 31 fellowships, worth from $200 to $600 a year. There are exceptional facilities to get in touch with the latest literature upon the subjects above mentioned. The library contains about 40,000 volumes, and receives over 200 journals, mostly technical in character.

Clarke, James Freeman, an American clergyman, was born at Hanover, N. H., April 4, 1810. He graduated at Harvard College and Cambridge Divinity School, becoming pastor of a Unitarian church at Louisville, Ky., and afterward of the Church of the Disciples in Boston. Dr. Clarke became widely known as a religious writer. His best known books are *Ten Great Religions* and *Orthodoxy, Its Truths and Errors.* He died June 8, 1888.

Clark, Capt. Wm. See LEWIS AND CLARK EXPLORATION.

Clarks'ville, Tenn., a city and county-seat of Montgomery County, is located on the Cumberland River, about 40 miles from Nashville. The surrounding country is a tobacco-growing region, and the city has tobacco and snuff-factories and lumber and flour-mills. The Southwestern Presbyterian University is located at Clarksville, and the city is served by the Louisville and Nashville and Tennessee Central Railroads. Population, 8,548.

Claude Lorrain (*klōd-lŏr-rān'*) (real name Claude Gelée), landscape painter, was born at Champagne in 1600. When a boy, he was carried to Rome by a relative who deserted him. But he soon obtained a place as servant to a painter, learning to paint as he ground his master's colors. After wandering about Europe, he painted for ten years at Rome before his pictures were sought after; but four landscapes painted by him for the pope gave him the fame he had been working for. He painted about 400 landscapes. Among the best are the series, *Morning*, *Noon*, *Evening* and *Twilight.* Claude himself liked best his *Villa Madama*, keeping it in his study and refusing to sell it, even when the pope offered for it as much gold as would cover the canvas. He also produced etchings, of which *Le Bouvier* is the finest. Claude's pictures brought such high prices, even during his lifetime, that many copies and imitations have been sold as his. He died at Rome in November, 1682.

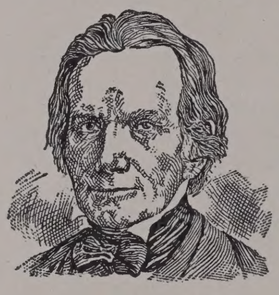
Claudius, Roman emperor, a nephew of Emperor Tiberius, was born at Lyons, in Gaul, in the year 10 B. C. A sickly boy, he was neglected and left pretty much to himself, growing up a timid student. When Caligula was murdered, he hid himself in a corner of the palace, fearing that he would be the next victim. A common soldier, finding him, saluted him as Emperor; others entered and bore him to the camp, where he was crowned, 41 A. D. In his reign the southern part of Britain was conquered and Mauritania made a Roman province. At home his rule was mild in the main, but he was influenced by his wives—he married four times—to commit some cruel acts. Two of his wives, Messalina and Agrippina, were among the worst Roman women of whom we know; and it was Agrippina who poisoned him in 54 A. D. to secure the throne for her son, Nero. Claudius built the famous Claudian aqueduct, and spent large sums in other improvements at Rome.

Clausius (*klou′zē-ŭs*), **Rudolf Julius E.,** a distinguished German physicist, born at Köslin, in Pomerania, Jan. 2, 1822; died at Bonn, Aug. 24, 1888. He was educated at Berlin University, where he later became *privat-docent* and still later an instructor in the school of artillery. In 1855 he went to Zürich as professor of physics in the Polytechnic school; two years later he accepted the chair of physics in the University of Zürich. From 1869 until his death he was professor of physics in the University of Bonn.

His best work was done at Berlin, for it was here, between 1845 and 1850, that he placed the science of thermodynamics upon a sound basis, building the entire structure upon the then recently discovered principle of the conservation of energy. In addition to this, his most important contributions are perhaps to the kinetic theory of gases and to the subject of radiant heat.

Clay is a term rather loosely applied to all sorts of earthy matter, which, when wet, becomes sticky or plastic. In this respect, clay is in contrast with sand. The stickiness depends in part on the size of the individual particles. The smaller they are, the more tenacious the clay. Clay originates from the decomposition of certain sorts of rock, especially those containing feldspar. In the popular use of the term no account is taken of the composition of clay, but silicate of alumina is a common constituent. Common clays also contain free silica, iron oxide, etc. When beds of clay are solidified by natural means, they constitute the rock known as shale. Flagstones are a variety of shale, and slate is a variety of rock formed from shale by great compression. Clay is widely used in the manufacture of brick, tile, pottery, etc. and in modeling. For the finer wares, such as china and porcelain, especially fine grades of clay (kaolin) are required. The value of the products manufactured from clay in the United States in 1898 exceeded $71,000,000. The leading states in the utilization of clay, in the order of their importance, are Ohio, Pennsylvania, New Jersey, Illinois and New York. The value of the clay-products of these five states in 1898 was considerably more than half the total value of clay-products in the United States.

Clay, Cassius Marcellus, American statesman, abolitionist and United States minister to Russia, was born in Madison County, Ky., Oct. 19, 1810, and graduated from Yale in 1832. For a time he practiced law in Lexington, Ky., became a member of the state legislature and was an active antislavery man and the editor of *The True American*, which brought him into collision for a time with the proslavery men of his state. He served in the Mexican War of 1846–47 and was taken prisoner. He afterward took part in the elections of Presidents Taylor and Lincoln, and in 1861 was appointed United States minister to Russia, in which capacity he served from 1863 to 1869. He died Nov. 28, 1913. See the *Memoirs, Writings and Speeches of Cassius M. Clay.*



HENRY CLAY

Clay, Henry, a noted American statesman and orator, was born in Hanover County, Virginia, April 12, 1777. His father died when he was five years old, but his mother, a woman of great goodness and force of character, well supplied his place in the boy's training. After a meager amount of schooling, Henry entered a Richmond law-office. Commencing to practice at Lexington, Kentucky, he soon became known as an able lawyer, his high personal gifts, winning address and frank, hearty manner helping him here, as they did all through life. From the first he took an interest in public affairs, and after two years in the state legislature, was chosen United States senator to fill a vacancy. He at once became an advocate of the government's building roads, canals, etc., being known as a loose constructionist of the constitution, as it is called. His short term over, he went back to the Kentucky legislature. This was in the days of duels, and it is not strange that Clay should have fought two, one at this time in Kentucky and, later, one with John Randolph of Virginia, both growing out of politics. In 1809 he was chosen to fill a second vacancy in the senate. In this session he spoke in favor of protection to American manufactures against foreign traders. He also opposed the United States Bank, but later he changed his views in the matter, the only instance in which he ever changed his attitude on a political question. In 1811 he was elected a representative in Congress, and the day on which he took his seat was chosen speaker. He was heartily in favor of war with England, and named his committees with a view to an early declaration of war. The war party was in a majority in the 13th Congress, which met in May, 1813, and again Clay was made speaker. When overtures of peace were made by the British, Clay was appointed one of the commissioners, and helped to draft the treaty of Ghent. Re-elected to Congress while in Europe on this mission, he was chosen speaker for the third time, and, except one term, when he declined an election, he was a representative and speaker until 1825. At this session he made some of his finest speeches, in favor of the South American patriots who were struggling for independence from Spain; later on he was just as eager in behalf of Greece, when fighting to free herself from the yoke of Turkey. In 1821 he brought forward the famous Missouri Compromise; 20 years afterward, when South Carolina wished to secede on the tariff question, he proposed a gradual lowering of the tariff, such as would work the least harm to manufactures; and in 1850 he attempted, by compromise, to settle the slavery question, which his Missouri Compromise had failed to dispose of, and in other ways he stood between the warring factions of north and south, to bring about concessions that would, in a measure, satisfy both sides, thus winning the title of the Great Pacificator.

In 1824 Mr. Clay was one of the four candidates for president, and received 37 electoral votes. In 1832 he ran for president again; but was beaten by Jackson. He was nominated again by the Whigs in 1844, but beaten by Polk, who received 65 more electoral votes. Clay served as secretary of state in John Quincy Adams' cabinet, and, besides filling the two vacancies in the senate referred to, was chosen senator from Kentucky for three full terms. One of those who opposed him politically is on record as saying that as a congressional leader Mr. Clay had no equal in America. He was the most persuasive speaker in the country during what was called the golden age of American oratory. He was, further, most popular with his party, while few men had a larger following of personal friends. He died at Washington, D. C., on June 29, 1852.

Clayton=Bulwer Treaty, a treaty concluded in 1850 between the United States and Great Britain, by which the contracting parties agreed that neither power should obtain or exercise exclusive control over a ship-canal then contemplated to be constructed across Central America and connecting the Atlantic with the Pacific. The negotiators were, on the part of Britain, Sir Henry Bulwer Lytton (afterward Lord Dalling), brother of the novelist; and, on the part of the United States, J. Middleton Clayton, secretary of state under President Taylor. The treaty, about 1880 and 1900, once more came under public discussion, in consequence of efforts being made to proceed actively in the construction of the Nicaragua Inter-Oceanic Canal, which many of our senators and public men desired to place, untrammeled, under the control of the United States. A new agreement was reached in 1901 through the adoption of the Hay-Pauncefote Treaty. This treaty omitted the restrictions against fortification, and this has been interpreted by the United States as giving her the right to fortify. Without such a right, the defenders of this interpretation point out, her coasts would be far more open to attack with the canal than without it. Her objections to defending the canal by agreement among the Powers are that such treaties are often observed only so long as it is to the interest of the parties to observe them; furthermore, that under such an arrangement the canal would be as open to the fleet of an enemy as to her own. Under her treaty with Panama the United States binds herself to maintain the neutrality of the canal, the independence of the republic of Panama and that the canal shall be open to all nations on uniform terms.

Clearing=House. See BANKS

Cleary, The Most Reverend James Vincent, Archbishop of Kingston, was born at Waterford, Ireland, 1828, and studied theology at Rome, Maynooth (Ireland) and Salamanca, Spain. In 1854 he was appointed professor of theology in St. John's College, Waterford, becoming president in 1873. He was appointed bishop of Kingston (Ontario) in 1880 and archbishop in 1889. He reopened Regiopolis College (theological) at Kingston in 1896, giving a large private contribution for the purpose.

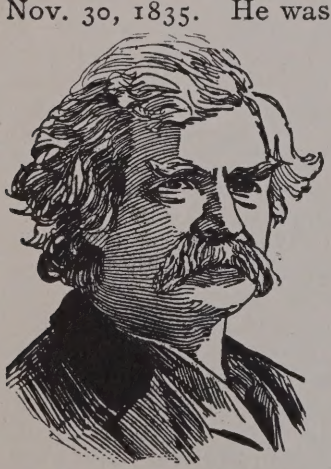
Cleburne, Texas, the county-seat of Johnson County, is located in a good agricultural region. Its leading industries are cotton-gins, flour-mills and machine-shops. The division-offices and shops of the Gulf, C. & S. F. R. R. are located here. Cleburne has good schools, and is a growing, progressive city. Population, 16,505.

Cleistogamous (*klīs-tŏg'ȧ-mŭs*) **Flowers** In many flowering plants, in addition to the ordinary conspicuous flowers, there are other flowers which are very small and inconspicuous, and even concealed. The common violet is a prominent illustration of such a plant. Cleistogamous flowers are now known in very many genera. Such flowers never open, are self-pollinated, and are very productive of good seed.

Clem'atis. A genus of plants of the crow-foot family, consisting of climbing vines or erect herbs, all more or less woody About 150 species are recognized. which are widely distributed, about 20 of them being native to North America. Many of the climbing species are cultivated to cover walls, arbors, etc. The flowers are often very showy and of numerous shades.

Clémenceau (*klā'män'sō'*), **George B. E.,** a French statesman and senator and premier of France and minister of the interior, under the presidency of Armand Fallieres. A clever debater and born orator, as well as an able journalist in his day, M. Clémenceau is one of the most picturesque figures in modern politics. A native of Brittany (he was born in 1841 in the department of La Vendée), he early studied and for a time practised medicine in Montmartre, and then travelled abroad, paying a brief visit the while to the United States. In 1869 he returned to France, and two years later was elected to the National Assembly, later on becoming a member of the Chamber of Deputies and leader of the Extreme Left. Though holding radical views, he has usually acted with moderation and good sense, though he was compelled successively to oppose Gambetta, Jules Ferry and the Boulangists. For a number of years he devoted himself to journalism, editing for a time not only his radical journal, *La Justice*, but contributing many notable articles to *L'Aurore*, among them several defending Dreyfus. besides writing fiction and social studies and taking active part in politics and the questions of the day. With the fall of Painleve in November, 1917, and in response to an overwhelming popular demand, Clemenceau was again made premier. Among his published works are *Les Massacres d' Armènie* (1896), *Les Phis Forts* (1898) and *La Mele Sociale* (1895). He was of great service to the allied cause in the European War (*q. v.*).

Clemens (*klĕm'enz*), **Samuel Langhorne** (MARK TWAIN), was born at Florida, Mo., Nov. 30, 1835. He was first a printer, and afterward a pilot on the Mississippi River. One of the commonest sounds heard on a Mississippi steamboat in shallow water is the call of the man sounding the depth of the water —"Mark Twain," meaning mark two fathoms; and when Clemens wanted a pseudonym, he took this familiar call. After spending some time in the silver mines of Nevada, he became a journalist in San Francisco. He became widely known as a humorist through his first book, *Innocents Abroad* which he brought out in 1869. *Tom Sawyer*, perhaps his most popular work, was published in 1876. Other of his works are *A Tramp Abroad* (1880); *The Prince and the Pauper* (1882); *Life on the Mississippi* (1883); *Huckelberry Finn* (1885); *Pudd'nhead Wilson* (1895); *Tom Sawyer Abroad* (1894); *Personal Recollections of Joan of Arc* (1896); *Following the Equator* (1897); *The Man that Corrupted Hadleyburg* (1900); *Christian Science* (1903); *How to Tell a Story* (1904); and *Editorial Wild Oats* (1905).



SAMUEL L. CLEMENS

Through the failure, in 1894, of the publishing house of Charles L. Webster & Co., of which he was the founder, Mr. Clemens was left deeply in debt. To retrieve his fortune he entered upon a lecturing tour, which extended around the world and furnished material for *Following the Equator*. On the completion of this tour he resided for a time in Vienna. He returned to America in 1900, and actively resumed literary work. In 1907 he visited England, where he was most heartily received, and was honored with the degree of D.C.L. from the University of Oxford. Mark Twain's humor is simple and direct, never strained, and has been described as "a sort of good-natured satire in which the reader may see his own absurdities reflected." He died April 21, 1910.

Clement (*klĕm'ent*), the name of 17 popes.

Clement XIV was born in 1705, near Rimini, Italy. He studied and taught philosophy and theology, was a friend of Benedict XIV, became cardinal under Clement XIII, and was elevated to the papal chair on May 19, 1769. In 1773 he issued his famous brief, suppressing the Society of the Jesuits. He was remarkable for his high character and learning as well as for his liberal ideas. He died on Sept. 22, 1774.

Clementi (*klā-mĕn'tē*), **Muzio** (1752–1832), an Italian composer and pianist. The work by which he is best known is his *Gradus ad Parnassum*, a series of 100 piano-studies. Though his contemporary, Mozart, spoke of him with a sneer, he was highly esteemed by Beethoven for the virile and artistic traits developed in his sonatas.

Cleopatra (*klē'ō-pä'trā*), daughter of the Egyptian king Ptolemy Auletes, was born in 69 B. C. Her father wished her to reign jointly with her brother, who was also, according to the Egyptian custom, to be her husband; but the boy's guardian drove her from the throne. She was just about to return from Syria, backed by an army, when Cæsar reached Egypt in pursuit of Pompey. Her charms won the great soldier to her cause, who placed her again on her throne, this time with a still younger brother as colleague and husband, of whom she quickly rid herself by poison. Soon after she followed her conquering lover to Rome where she was covered with honors. After the battle of Philippi, Mark Antony summoned her to appear before him at Tarsus. The Egyptian queen sailed up the River Cydnus to meet him, in a sumptuous galley, arrayed as Venus rising from the sea. Then under thirty years of age, in the perfection of her Grecian beauty, she fascinated the heart of Antony, who henceforth became her lover and slave. Leaving her to marry Octavia, sister of Octavianus (afterward Emperor Augustus), he hurried back to the arms of Cleopatra, who met him in Syria and proceeded with him on the march to the Euphrates. After this, Antony's time was spent mostly with her at Alexandria, where he loaded her with gifts and honors. It was Cleopatra's counsel that Antony followed in risking the naval battle of Actium; and when she fled with her sixty ships, he forgot everything else, and "flung away half the world to follow her." When Augustus appeared before Alexandria, the fickle queen at once treated with him for her safety; while Antony, on being told that she had killed herself, fell on his sword. But finding the report was false, he had himself carried into her presence and died in her arms. Cleopatra, now Augustus' prisoner, finding that she could not win him, as she had won Cæsar and Antony, from disappointed pride took poison or killed herself by suffering an asp to bite her bosom (30 B. C.). Two women only, Helen of Troy and Mary Stuart, vie with Cleopatra in the fascination which her story exerts over men's minds.

Cleopatra's Needle. See OBELISK.

Cleveland (*klēv′lănd*), a city and the seat of Cuyahoga County, Ohio, is situated on the south shore of Lake Erie, at the mouth of the Cuyahoga River. It is the largest city in the state, and the fifth largest in the United States. It is the chief port of entry of the Great Lakes. An important industrial and commercial center, Cleveland is situated at the very crossroads of commerce, in the heart of the nation's industrial empire. Within 500 miles of Cleveland live fifty-five per cent of the people of the United States, representing eighty per cent of the nation's wealth and seventy-five per cent of its manufacturing resources. Los Angeles is the only one of America's ten largest cities that is distant more than a twenty-four hour train ride from Cleveland.

Description. Cleveland is located on a sloping plateau, 689 feet above sea level, and rising at its highest point to 302 feet above Lake Erie. It is cut nearly in half by the Cuyahoga River, crossed by several bridges, the most famous of which is the "High Level," one of the largest double-deck reinforced concrete spans in the world. It connects Superior Avenue on the east with Detroit Avenue on the west, and is the most heavily travelled bridge in the world. It is 2,280 feet long, with a center span ninety-five feet above the level of the lake. The lower level of this $5,407,000 bridge is used for street cars, and the upper level for pedestrians and vehicles. The Lorain-Central high level bridge, erected at a cost of $8,000,000, is also important. The public piers, covering five acres, were built at a cost of $500,000. The land along the river is low and flat, occupied by industry. From this, the city rises in various levels, connected by viaducts and bridges.

Cleveland has been called the "Garden City of the Middle West," because of its many parks, its wide thoroughfares, and beautiful residence streets bordered by majestic shade trees. It lies in the nation's belt of "maximum energy." Tempered by Lake Erie, it has an excellent climate, the temperature rarely exceeding ninety degrees. An extensive summer colony occupies the nearby lake shores, famous for the healthful climate.

The Cleveland Railway Company operates over 300 miles in regular routes of double track street railway, and 418 miles in all, supplemented by motor coaches, all converging at the Public Square. Highway improvement has been planned to occupy the next ten years. America's trunkline airways converge at Cleveland at the largest municipal-owned airport in the world, which was opened in 1925. It covers 1,000 acres, and was developed at a cost of more than $1,250,000. The field is located nine miles from the heart of the city. At night, it is illuminated by floodlights of 500,000,000 candlepower. Three thousand passengers are served here weekly.

Buildings and Churches. The Cleveland plan for its public buildings is unique and represents an aggressive civic enterprise. The Cleveland Mall consists of 104 acres in the heart of the city, T-shaped, where the main public buildings are grouped. Euclid Avenue, called "America's Whitest Way," is a famous thoroughfare threading its way through these canyon walls, lined with stores, shops and theatres. Imposing public buildings line its thoroughfares. The most outstanding structures are the Chamber of Commerce, the Federal Building, Western Reserve Historical Society building and Public Hall. "Playhouse Square," at Euclid Avenue, Huron Road and East Fourteenth Street, is the amusement center.

Among other beautiful structures are Cleveland's many churches. The Moravians were the first religious group to settle near the city, but the Episcopalians held the first religious services. The city is famed as the first to organize a central church federation. In 1830 there were but three churches in this city which now boasts more than 700. The Old Stone Church, sentinel-like on the Public Square, is the most picturesque.

The Museum of Art in Wade Park, is a beautiful structure approached through the Fine Arts Garden with its famous "Fountain of Waters." The majestic Garfield Monument in Lakeview Cemetery is conspicuously placed on a ridge 250 feet above the lake. In the public square is the Soldiers' and Sailors' Monument, and statues of Tom L. Johnson, a former mayor, and Moses Cleaveland, who designed the plan of the city.

Parks. This "Garden City" has ninety miles of parks and boulevards. The twenty parks are beautiful with deep ravines, natural waterfalls, fine old forests, and mirror-like lagoons. The Zoölogical Gardens of Brookland Park are beautiful. Cleveland has park-like supervised playgrounds. Beyond the city park system is the Metropolitan Park belt following Chagrin River on the east, Tinker's and Chippewa Creek on the south, and Rocky River on the west. This park belt extends over 10,000 acres of picturesque rolling land, through virgin forests. Its ninety miles of roadways afford beautiful drives.

Commerce and Industry. Cleveland, centrally situated, with its advantages of raw materials, labor supply, and remarkable shipping facilities, is the largest manufacturing center in Ohio and second largest on the Great Lakes. Its chief fame rests in the diversification of its commerce. There are more than 200 classes of industry to be found here, where 2,200 manufacturers produce more than 10,000 different articles. The most important industry is iron and steel; foundry and machine shops rank second, and the manufacture of automobiles third. Cleveland is the first city in the United States in the production of wire and wire nails. Other important industries are paints, varnishes, electric equipment, clothing, chemicals, bricks and tile, printing, brewing, and refrigeration. In 1870 John D. Rockefeller founded the Standard Oil Company in Cleveland, and to-day one of the largest oil refineries in the world is located there. From early times Cleveland led in the production of wooden vessels for lake traffic, and with the change from wood to iron has maintained that position. To-day Cleveland is first among American cities in the production of steel merchant vessels. This city is also the largest American market for fresh-water fish. Cleveland is the largest ore market in the world, the chief lake traffic at this port being in iron, coke, and coal.

Education. The first free public school west of the Alleghenies was established in Cleveland in 1800. The city is now a model for metropolitan education. There are 168 public schools with an enrollment of 150,000, and almost 4,700 teachers. There are 123 parochial schools with an enrollment of 46,946 and 1,092 teachers. Cleveland also maintains vocational and technical schools, and special classes for the deaf, blind and crippled. Western Reserve University was formed in 1881, and Western Reserve College, founded at Hudson, Ohio in 1826, moved to Cleveland to become a part of it. The Case School of Applied Science, one of the leading engineering and technical schools, was established in 1881. There are colleges of law and medicine, professions and trades. Cleveland is an outstanding medical center. The University Medical Group and the Cleveland Clinic of specialists are especially famous. Catholic institutions of higher learning include St. Mary's Theological Seminary, St. Ignatius College, John Carroll College for men, and Ursuline and Notre Dame for women.

Government. Cleveland ranks as one of the best-governed cities in the country. In 1924, there was adopted a commission form of government. In 1931, however, the city voted to return to a mayor and council form of government.

History. The city was laid out in 1796 by Moses Cleaveland, the chief surveyor of the Connecticut Land Company. The village at first bore his name and its spelling. The present spelling became permanent in 1831, because the "a" in the name made the word a misfit in newspaper headlines. The first town meeting was held in 1802, the village incorporated in 1814, and the city in 1836. In 1825 Cleveland Harbor was improved by the aid of a $5,000 appropriation from Congress. The Ohio Canal from Cleveland to Portsmouth was begun in that same year and completed in 1832. In 1851 the first train entered the city from Columbus. In 1854 Cleveland was united with Ohio City. Since that time its growth has been rapid.

The population of Cleveland in 1830 numbered 1,176. In 1850, it had grown to 17,034. Fifty years later, in 1900, the population was 381,768; and in 1930, it was 900,429.

See OHIO.

Cleveland, Stephen Grover, an American statesman and the twenty-second and twenty-fourth President of the United States, was born at Caldwell, New Jersey, on March 18, 1837, the son of a Presbyterian minister. Although the lad was christened Stephen Grover, he dropped the name Stephen before reaching manhood. At the age of sixteen he was ready to enter college. His father's death at just this time made it necessary for him to seek work so as to be able to support his mother and sisters. He passed one year in teaching at the school for the blind at Batavia, New York. In 1855, on borrowed money, he set out for Cleveland, Ohio. Upon reaching Buffalo, New York, he was persuaded by an uncle to take up the study of law. In 1859 he was admitted to the bar in New York State. He began the practice of law at Buffalo. From 1863 to 1866 young Cleveland served as assistant district attorney for Erie County. In 1870 he became sheriff. The prosperous young lawyer soon became Mayor of Buffalo.

In 1882 he was elected governor of New York State by a majority of 190,000. He was elected President of the United States in 1884, receiving 219 electoral votes. The most important act of his administration was his message to Congress in 1887 in which he commented forcibly on the reduction of the great surplus in the national treasury, advising a careful tariff readjustment, especially on certain manufactured articles of import. He also advised the duty-free admission of certain raw materials. The election of 1888 turned on this tariff which had become a political issue. Grover Cleveland was defeated in this election by

General Harrison, receiving only 168 electoral votes, while his opponent won 233 such votes.

During his term as President he married Frances Folsom of Buffalo, who brought social success and popularity into his administration. In 1892 he was nominated a third time for the presidency, and was elected, this time defeating General Harrison. His second administration added to his fame as a wise and able executive. It was characterized by his energetic urging of currency reform, the repeal of the Silver Act, and his determined stand against the Republican high tariff policies. A message to Congress, in December, 1895, on intervention in the British-Venezuela dispute, for a time threatened war between Great Britain and the United States. After McKinley's inauguration in March, 1897, Grover Cleveland retired to private life at Princeton, New Jersey. There he frequently addressed assemblies at Princeton University. These addresses were published in a collection in 1904. He died at his New Jersey home on June 24, 1908.

Cliff Dwellers. See PUEBLOS.

Clingman, Thomas Lanier, United States Senator and Confederate officer, was born in North Carolina in 1812. After studying law, he became a member of Congress, serving from 1843 to 1858. He was a prominent debater in the House during these years. He deserted his Whig policies for the Democratic party, and in 1858 was elected to the Senate. When the Civil War began in 1861 he left the Senate and entered the Confederate Army, where he became brigadier-general. He surrendered with General J. E. Johnston in April, 1865. After the war, General Clingman devoted himself to mining and to scientific pursuits. He died in Raleigh, North Carolina, on November 4, 1897.

Clinostat (*klī'nō-stăt*), an apparatus for rotating plants in various planes to counteract the effect of a one-sided stimulus, such as light or gravity. It consists of a strong clock-work, with suitable regulating mechanism and devices for holding the pots in which the plants grow. See IRRITABILITY.

Clinton, a city and seat of Clinton County, Iowa. It is situated on the Mississippi River between Davenport and Dubuque, Iowa, 138 miles west of Chicago. It is served by a number of railroads, by steamboats on the Mississippi River. Two fine bridges connect it with Illinois and the east. There are two academies in Clinton, and Wartburg College is located here. Among the many thriving industries of Clinton, are foundries, machine and car-shops, bridge and iron works, sugar refineries, roofing mills, and the manufacture of sashes and doors, wagon boxes, locks, cloth, boilers and bricks. The population of Clinton, in 1930, was 25,726.

Clinton, a town in Worcester County, Massachusetts, is situated twelve miles from Worcester, on the Nashua River. It is served by the New York, New Haven and Hartford, and the Boston and Maine railways. The principal manufactures are ginghams and plaid materials, worsteds and carpets, machinery, and wireworks. Clinton has several important buildings including several churches, a hospital, and the Bigelow Free Public Library of 25,000 volumes. The Massachusetts Dam and Reservoir is situated here and supplies Boston and the metropolitan district with water. In 1930 the population of Clinton was 12,817.

Clinton, De Witt, an American lawyer and statesman, was born at Little Britain, New York, on March 2, 1769. He was a son of General James Clinton, and a nephew of Governor George Clinton. He was graduated from Columbia College, and admitted to the bar in 1788. He became private secretary to his uncle, George Clinton, and entered politics as an anti-Federalist. In 1797, he entered the New York legislature as a Republican member of the lower house, where he soon became the state leader of his party. In 1802, at which time De Witt Clinton was regarded as "the most rising man in the Union," he was elected United States Senator. He resigned in 1803, however, to become mayor of New York City. He held this office for eleven years, but was finally defeated because of his determined opposition to Tammany. He competed for the presidency with Madison, winning eighty-nine votes in the contest, which hinged on the question of war with England (1812). He was four times elected governor of New York. His entire life-work was identified with the early growth of the state. Perhaps his most outstanding service was in urging the construction of the Erie Canal, and continuously forwarding the enterprise until the canal was opened for traffic. He also rendered great service in establishing the public school system in New York. He was actively interested in scientific and social problems, and caused the modification of the laws governing debtors and criminals. As Governor of New York he was responsible for the introduction of the so-called "spoils system" into New York politics. His important works include: *Discourse before the New York Historical Society; Memoirs on the Antiquities of Western New York; Letters on the Natural Historical and Internal Resources of New York* and *Speeches to the Legislature.* He died at Albany, New York, on February 11, 1828.

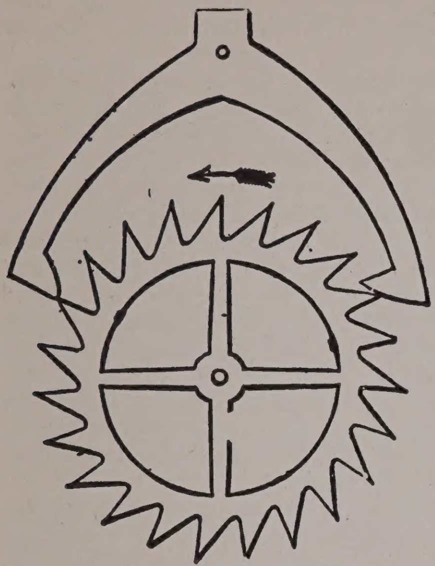
Clinton, George, an American statesman, was born in Little Britain, New York, on July 26, 1739. He was carefully educated at home. As a lieutenant of militia, he took part in the expedition against Fort Frontenac in Canada. He began a career in law, but was elected to the colonial assembly. There he soon became the head of the Whig party. In 1775, as a member of the Continental Congress, he voted for the Declaration of Independence. He was later appointed brigadier-general. In 1777 he was elected governor of New York, and was re-elected six times in succession. In the Revolutionary War, it was due to Clinton that communication was hindered between the British in Canada and those in

New York city. The number of Tories in the state made his position the most difficult to fill of any in the country, except that of Washington. When the time came to adopt the Constitution, Clinton opposed it, on the ground that it gave the general government too much power. In 1804 he was elected vice-president of the United States, on the ticket with Jefferson, and was re-elected in 1808. He died at Washington, D. C., April 20, 1812.

Clinton, Sir Henry, an English general, was born about 1738. He served in the Seven Years' War, and was sent to America as major-general in 1775. He took part in the battles of Bunker Hill and Long Island, and captured Fort Clinton on the Hudson. In 1778 he became commander-in-chief of the British land-forces. He was forced out of Philadelphia by Washington, captured Charleston in May, 1780, and sailed from New York with 7,000 men to relieve Cornwallis on the day he surrendered. He was superseded by Sir Guy Carleton in 1781. Later on, he was appointed governor of Gibraltar, where he died December 23, 1795.

Clive (*klīv*), **Robert, Lord,** founder of England's Indian empire, was born near Market-Drayton, England, Sept. 29, 1725. At school Robert was a much better fighter than a scholar. At 18 he went to India as a clerk of the East India Company, where, penniless and tired of the drudgery of his life, he attempted suicide, but his pistol snapped twice, and he decided to bear his trouble a while longer. When the French took Madras in 1746, Clive escaped in the night from the city, disguised as a Mohammedan, and made his way to Fort St. David. Now 21, he was commissioned as ensign in the military service of the company. India was at this period rapidly falling into the hands of the French, and the safety of the English trading-posts was gravely in peril. Clive, now 25, had gained a name for desperate courage as well as for military genius. Assuring his superiors that a move must be made at once on Arcot, he was intrusted with 200 British troops and 300 Sepoys. He seized Arcot without a blow, and with his little force, now reduced to 80 Englishmen and 120 Sepoys, he withstood a siege of 7,000 natives and 120 French soldiers for 11 weeks. Then, after a last assault, the siege was raised, and Clive, marching out, won two battles and captured two important forts. After two years spent in England, where he refused a diamond-hilted sword from the company until another was given to his superior officer, he came back to India in 1755 with the rank of lieutenant-colonel. A year later, with Admiral Watson, he sailed for Calcutta, to avenge the Black Hole massacre. Calcutta and other places were speedily taken from the barbarous nawab of Bengal, Surajah Dowlah, and at Plassey, June 23, 1757, Clive's 3,200 men, two thirds of whom were Sepoys, fought 50,000 natives, supported by 40 French guns. After eight hours' fighting, Clive won the decisive battle which fastened English rule upon Bengal. Mir Jaffir, one of the nawab's generals, had agreed before the battle to keep his forces inactive, for which he was to be made nawab. An unscrupulous go-between threatened to betray this agreement, and demanded from the British a large sum of money. Clive, however, overreached him by a false treaty, to which he forged Admiral Watson's name. When Plassey had been won, Mir Jaffir was at once declared nawab, and, leading Clive into the great treasury of Bengal, told him to help himself, which he did, taking over $1,000,000. These are the only two blots on his character. For three years Clive was ruler in all but name in Bengal, and was always called by the natives Sabat Jung, the daring warrior. In 1760 he returned to England, where he was welcomed by the great Pitt, as "a heaven-born general," was chosen member of Parliament, and made baron of Plassey. But by 1765 the affairs of the East India Company were in a bad way, owing to the rank dishonesty of its servants, and only Clive could set them right. As governor and commander-in-chief of Bengal, he set out a third time for India. At once he attacked the widespread abuses with vigor. At one time 200 officers of the army resigned, thinking to force him to submit by the sight of an army without leaders; but the Sepoys stood firm, and by issuing commissions for new officers, even to clerks, and by ordering every resigned officer to be brought to Calcutta he quelled all insubordination. But the energy with which he had cleaned that Augean stable had raised up a host of powerful enemies, who, after he had left India for good, stirred up Parliament to look into his early proceedings in Bengal. Attacked in regard to the fortune he had amassed, he described the glittering heaps on which he had gazed in the treasury of Bengal, and exclaimed: "Mr. Chairman, at this moment I stand astonished at my own moderation!" This storm of enmity broke his health and unhinged his mind, and opium did the rest. He died at London by his own hand, Nov. 22, 1774.

Clock. An ordinary clock is a machine for driving a wheel at the uniform rate of two revolutions a day. The energy for driving the machinery is stored up either in a raised weight or in a coiled spring. The uniformity of the motion is secured by use of a pendulum and an escapement. The clock in this form was invented by the great Dutch physicist Huygens in 1657. Galileo had already shown that the pendulum, when left to itself, performs its vibrations in equal times. Huygens showed how the pendulum might be kept going and the advantage of its uniform vibrations thus be obtained. This he accomplished by the introduction of the escapement, a mechanism which is unlocked by the pendulum at each beat and thus allows the train of wheels to advance. But in addition to this the escapement also gives the pendulum a little push, which just makes up for the loss of energy which the pendulum sustains in swinging through the air and in unlocking the train.


ANCHOR ESCAPEMENT

The action of the escapement will be evident from the accompanying figure, in which the arrow indicates the direction in which the mechanism is driven by the spring or weight. In the upper part of the figure are represented the two pallets which receive alternate pushes to right and left as, one after another, the teeth of the wheel pass. A good clock of this type keeps better time than the sun; and accordingly we now use as our standard of time the period of revolution of a fictitious sun which revolves uniformly with the average speed of our actual sun. This is called mean solar time. The astronomer uses a clock in which the hour-hand rotates at the same rate at which the fixed stars appear to revolve about the earth. In other words, this instrument, which is called a sidereal clock, rotates at the same rate as the earth, which is the most uniform motion that we know anything about.

American clock-making from early days has had an interesting history, the men who have been connected with it being many and in their way characters, from Isaac Doolittle, in the old colonial times, who as a brass-founder built a bell-foundry and made brass wheel-clocks, to the era of the New Haven Clock Co., with its originators in Hiram Camp of Plymouth and Chauncey Jerome of Bristol, Conn. Interesting, too, is the story of Eli Terry, the father of wooden clock-making, as is that of the men who had to do with the New Haven concern—such as James E. English, H. M. Welch and Hiram Camp, the latter the inventor of a number of automatic tools and machines for making parts of clock-works, and perhaps the greatest of American clock-makers.

The chronometer is merely a spring-clock in which an oscillating wheel called the balance is employed instead of a pendulum. This wheel is lightly tethered by a fine spring called a hair-spring, and its value lies in the fact that its vibrations occupy equal times. In 1714 the British government offered a reward of $100,000 to any one who would devise a means for getting longitude at sea within 30 miles. Stimulated, perhaps, by this offer, John Harrison (1693–1776), an English mechanician, invented the chronometer, which enabled navigators even then to determine their longitude within 18 miles.

A watch is merely a small chronometer that can be carried in the pocket. A striking clock is one fitted with a bell which is struck by a hammer at certain equal intervals, generally an hour. It is this form of instrument from which we derive our word clock, which originally meant a bell. Driving-clocks are really engines operated by a spring or weight. Telescopes in observatories are made to follow the stars by means of such driving-clocks.

Time-keeping before the invention of clocks was a very crude process. During the day the ancients were dependent upon the position of the sun, and during the night upon the positions of certain well-known fixed stars. Intervals of time were measured by allowing sand or water to run through funnel-shaped vessels, called hour-glasses and clepsydræ respectively. See Sir E. Beckett's *Clocks, Watches and Bells;* Benson's *Time and Time-Tellers* and Britten's *Watch and Clock-Makers' Handbook.*

Close Pol'lina'tion (in plants), the transfer of pollen from the stamen to the stigma of the same flower. See POLLINATION.

Clouds are masses of water-vapor condensed into very minute drops of water or frozen into very small particles of ice. Every one is familiar with fogs. Clouds are simply fogs formed at a considerable distance above the earth. They are generally white in appearance for the same reason that any transparent substance, such as glass or sugar, is white when broken up into small particles.

The classification of clouds generally employed is the one which divides them according to their external appearance into four different groups:

1. The *cirrus* or mare's tails clouds are composed of long white fibers or slender filaments. They are generally observed at great heights, and are probably composed of small crystals of ice. Glaisher in his balloon-ascents found cirrus clouds above him even at the height of 23,000 feet; while, on the other hand, cirrus clouds are

never seen below the summit of Mt. Blanc, which is nearly 16,000 feet in elevation.

2. *Cumulus* clouds are those which look like great mountains of cotton piled one on top of another and resting on horizontal bases. These fleecy bases range from 2,000 to 4,000 feet high and the tops are twice that distance from the earth. In thunderstorm proportions the cumulus tops are often three to four miles high. Only clouds from intense volcanic eruptions are higher. In 1883, after the great Krakatoa explosion, clouds over northern and central Europe were fifty miles high.

3. *Stratus* clouds are in large flat layers or horizontal sheets. They are frequently seen at sunset, and often merge into the nimbus.

4. The *nimbus* or rain cloud has no particular form, but is generally large and dark.

Clouds are caused by lowering of the air temperature below the dew-point. If this is done by radiation of heat from the earth to space, land fogs are produced. Radiation from the earth's atmosphere to space, expansion of heated air rising into higher regions where the pressure is less, and a cold wind blowing into a region of warm, moist air, will also lower the temperature sufficiently to form clouds. The presence in the air of small dust particles is also necessary.

Contrary to popular belief, clouds do not float. They constantly tend to fall. The cumulus is supported in the air by the strength of the ascending air current of which it makes the top. When the current ceases, the cumulus begins to fall, but probably evaporates quickly and thus disappears. Sometimes it has the effect of a light shower from a clear sky. The high cirrus, feather curls and trails, are large snow particles dropping back in blurry snow or rain. As long as condensation is favored, the cloud keeps forming and replacing these particles, and thus seems to be aloft, although it is actually constantly falling.

An interesting cloud development is the "lid" or "ceiling" formed when a layer of warm air rests on a layer of cold air. This ceiling is a tangible obstruction in aviation, as airplanes receive smart bumps when they strike it, and free balloons rebound from it. A low lid or ceiling also impairs visibility. The most famous instance is that of the London fog, where the soft coal products below the lid of air make a pall-like covering until the lid and the particles are dispersed by an increasing wind or a general cooling of the air.

Clough (*klŭf*), **Arthur Hugh,** an English poet, was born in Liverpool, in 1819. He was educated at Rugby and at Oxford University, and remained deeply interested in educational work. He belonged to the school of scholarly skeptics, with Arnold and Swinburne. It has been said that Clough had "neither the strength to believe nor the courage to disbelieve." He wrote poems vigorous in tone and hopeful in spirit, with frequent touches of wit or pathos, and noble sentiments. His most noted poem is *The Bothie of Toberna-Vuolich.* He was a friend of Matthew Arnold, who immortalized him in his famous poems, *Thyrsis,* one of the four greatest threnodies in the English language, and *The Scholar Gipsy.* Clough died in 1861.

Clover, any plant of the genus *Trifolium,* a low herb with trifoliate leaves and a roundish head or oblong spike of flowers. It belongs to the pea family. The common clovers are valuable forage and bee plants, as the red clover, white clover, alsike, crimson clover and buffalo clover. There are about three hundred species of the trefoils, and most of them are natives of Europe, although there are about sixty native North American species. The red clover region in the United States is around the Great Lakes, with Toledo, Ohio, as the greatest clover seed market. Other plants in the same family are the sweet clover (*Melilotus*), prairie clover (*Petalostemon*), and the bird's foot clover (*Lotus*).

The true clover is an exceedingly valuable plant. The common red clover (*Trifolium pratense*) is the most important species to agriculturists. As a forage plant, it is excellent, adapting itself easily to different climates and soils, and giving a good yield with high nutritive value. Clover is fed as pasture, hay, green fodder and silage. It is a very satisfactory food for pigs, sheep and cattle, but is too dusty for horses. Clover is also useful as green manure and as a cover crop. It is of great importance in making the soil richer, as it draws free nitrogen from the air and works it over into nitrates for plant food. A growing crop of clover is often "turned under" to still further enrich the soil, a most effective method of adding humus. The clovers have deep roots with many ramifications, which greatly improve the physical condition of the soil, thus increasing its fertility. Crimson clover is used as a cover crop for United States orchards. It keeps the soil from drying and hardening, and also makes plant food for the next season's growth of young trees. As a cover crop, it should be sowed in late summer and plowed under early the following spring. Many farmers harvest the first crop of clover and sow the second to plow under, thus benefiting from two crops in the one season. The clover is a delight to bees, and a favorite source of nectar for honey-making. The bumblebee cross fertilizes clover, making it able to produce seed. From the enriching effect of clover on the land, has grown the common saying concerning one who is prosperous, "He lives in clover."

Cloves. See Spices.

Clovis, king of the Franks, was born in 465 A.D., a son of Childeric whom he succeeded to the throne. He conquered the Gallo-Romans, and overran the whole country between the Somme and the Loire. In 493 he married Clotilda, a Christian, and daughter of a Burgundian prince. She earnestly wished her husband to become a Christian also. In a great battle with the Alemanni near Cologne, Clovis was hard pressed, and at last in despair cried to the God of Clotilda, offering to become a Christian if he were given the victory. The Alemanni were driven from the field and on Christmas Day, Clovis, keeping his vow, was baptized with several thousand of his soldiers, by Bishop Remigius of Reims. Pope Anastasius bestowed on him the title of "Most Christian King."

In 507, he marched against Alaric II, a Visigoth, in the southwest of Gaul. He defeated and killed him at Vouglé near Poiters, and possessed the whole country as far as Bordeaux and Toulouse. Theodoric, king of the Ostrogoths, checked him, however, at Arles in 507. He died in the year 511 without having realized his great aim of a unified kingdom.

Club, an association formed for some social, literary or political purpose. It is a natural outgrowth of the gregariousness of man, who seeks to give dignity and meaning to his association with his fellowmen. It is probable that there were clubs in Rome, and perhaps such organizations in other ancient cities. London, however, is regarded as the home of the club, which originated there in connection with the coffee houses or taverns. Members gathered around a table at which they partook, usually, of the evening meal, and at the same time indulged in social or literary intercourse. One of the earliest clubs of importance was organized in the seventeenth century, and held at the Mermaid Tavern. Its members included Shakespeare, Beaumont, Fletcher, Sir Walter Raleigh, Donne, and Selden. The next century saw clubs flourishing in London. The Literary Club, presided over by Dr. Samuel Johnson, was the most famous, and is still in existence. Its original membership included such famous men from all cultural walks of life as Sir Joshua Reynolds, the famous portrait painter; Oliver Goldsmith, poet, playwright and novelist; Edmund Burke, statesman and orator; Edward Gibbon, historian; and David Garrick, actor. Dr. Johnson, trying to express in a single word the qualities which made a man eligible for membership, coined the expression "a clubbable man." The Kit-Kat Club in Queen Anne's reign was a famed political club, composed of Whigs, and had a rival in the Beefsteak Club, of Tory organization. Among the Kit-Kats were Addison and Steele, Congreve, Robert Walpole, and many of the nobility. There are now in London many clubs, one of the most noted of which is the Carleton Club, organized by the Duke of Wellington, and embracing a Conservative membership. The Reform Club is Liberal. Other famous modern London clubs are the Athenaeum, the Travellers, and the Army and Navy.

There are thousands of clubs in the United States, which is highly organized. The Union League Club of New York is one of the most noted. The United States is famed for clubs organized of the alumni of almost every university; the commercial clubs which are established in most cities of any size; and the country clubs, many of them extremely exclusive. The Yacht Club, Army and Navy Club, the Knickerbocker and Authors' are important. Almost every trade, profession, or interest now has its representative club, with more or less restrictive membership and worthy aim.

Clyde, the most important river in Scotland. It is formed by the union of the Daer Water and Potrail Water, with other small streams from the Hart, Queensberry and Lowther hills. It flows for 106 miles, past Lanark, Botwell and Glasgow, the head of navigation, and becomes a firth at Dumbarton. During its course it receives the waters of the Medwin, Carnwath, Mouse, Calder, North Calder, Kelvin and Levin rivers. Near Lanark are the four famous Clyde falls, the largest in Scotland. Corra Linn, the finest, makes three distinct leaps and has a height of eighty-four feet in all. These falls furnish power for many mills, especially in the cotton industry. Below Glasgow large sums have been spent in deepening the channel of the Clyde, so that the former depth of fifteen inches at low water has now become from eighteen to twenty feet. The last fourteen miles of the river, together with the firth, which slowly widens from one to thirty-seven miles, forms one of the world's chief commercial waterways. The Clyde is the center of the shipbuilding industry in Scotland. The first steamboat in Europe, the "Comet," was launched on the Clyde by Bell in 1812.

Clytemnestra. See AGAMEMNON.

Coal, a name applied to a solid, combustible mineral or considerable aggregations of carbonaceous matter of vegetable origin. Coal has no definite chemical composition, the proportion of carbon varying from ninety-five per cent or even more down to seventy per cent or a little below. Coal occurs in beds interstratified with such materials as shale, and sandstone. The vegetation from which coal was made is believed to have grown where the coal now occurs. At that time the regions, where the vegetation grew, are believed to have been swamps, comparable except in size to the peat-bogs of the present time. As this vegetation died, it fell into the water of the swamps, as in the case of the Dismal Swamp of the present time. Beneath the water it did not decay as it would have done in the open air. It underwent chemical changes, the first series of which resulted in its transformation into peat. After the accumulation of considerable beds of vegetable matter in the swamps, the sites seem to have been submerged, probably by sinking. When submerged, either beneath the sea or beneath the waters of lakes, sediment, such as sand or mud, was deposited over the accumulated vegetable matter. Thus buried, it was still more completely shut off from the air and underwent further chemical changes. At the same time the weight of sediment above the accumulated vegetation compressed it into more and more compact form. As the result of the chemical changes and the compression, the vegetable matter was gradually brought to the condition of coal.

In many regions there are numerous seams or beds of coal, one above another, separated by beds of shale, sandstone, etc. Each bed of coal represents the succession of conditions sketched above. After the burial of one body of vegetable matter the area was perhaps elevated sufficiently to cause it to become a marsh again, and the growth of vegetation followed. This in turn was buried.

Wood contains about 50 per cent. of carbon. In the chemical changes which it undergoes in peat-bogs, it loses some of the carbon, but still more of its oxygen and hydrogen, so that the proportion of carbon remaining after the changes is greater than before. Peat contains about 60 per cent. of carbon. With the loss of more hydrogen and oxygen, and with compression which renders it solid, peat is transformed into coal When the changes have gone so far that the proportion of carbon is as great as 90 per cent., the coal is anthracite. When the proportion of carbon is less, the coal is said to be bituminous or soft. Of bituminous coal there are many grades, depending partly upon the proportion of carbon. The chemical changes in the vegetable matter may go so far that the proportion of volatile matter (hydrogen and oxygen) is reduced to one or two per cent. In this condition the coal is said to be graphitic. Graphitic coal does not burn readily. Anthracite coal, which contains relatively little volatile matter, burns with little flame. Bituminous coal, which contains more volatile matter, burns with flame, and in general burns more readily as the proportion of volatile matter increases. There are several varieties of bituminous coal, named according to their uses. Among them are coking-coal, furnace-coal, cannel-coal, etc. Coking-coal melts on becoming hot, and after the volatile matter escapes the solid product is coke. It has much the composition of anthracite coal, but is spongy in texture. Cannel-coal is impure, and contains much volatile matter. It is rather earthy in texture, and less hard than most other varieties of coal. It is extensively used for burning in grates Furnace-coal is any sort of bituminous coal appropriate for use in furnaces.

Anthracite coal occurs mainly in regions of folded strata, where the folds have been greatly eroded. The compression to which the coal was subject in the process of folding, the heat generated by the compression and the subsequent exposure of the coal-beds after erosion, allowing the volatile matter to escape, have probably been the chief factors in the transformation of soft coal into anthracite. In some places in New Mexico and Colorado soft coal has been changed into anthracite by contact with lava. Bituminous coal, as may be inferred from the above, usually occurs in regions where the strata are horizontal or but slightly tilted.

The coal of the United States belongs partly to the carboniferous system (see GEOLOGY) and partly to the systems of later periods, especially to the last part of the cretaceous. There is a little coal in the triassic system of the east (Virginia and North Carolina), and very considerable quantities of coal in the tertiary of the west, especially in Washington.

The world's annual production varies from year to year. In 1930 it was some 1,410,000,000 metric tons (2,204.6 pounds). Production of the leading countries in metric tons was: United States, 418,782,00 bituminous and lignite, and 63,323,000 anthracite; British Isles, 247,662,000; Germany, 288,611,578; France, 53,884,035; Russia, (U.S.S.R.), 39,912,000; Poland, 37,499,548; Japan, 36,000,000; Belgium, 27,405,560; Czechoslovakia, 33,000,000 coal and lignite.

The United States coal-fields of the carboniferous period are as follows:

1. New England field (Rhode Island and Massachusetts—coal more or less graphitic and little used).

2. The Appalachian coal-field, including the coal-producing areas of Pennsylvania, eastern Ohio, Maryland, Virginia, West Virginia, eastern Kentucky and Tennessee, Georgia and Alabama; area, 58,695 square miles.

3. Northern coal-field, part of southern Michigan, 6,700 square miles.

4. The central coal-fields, including the coal-producing areas of Indiana, Illinois and western Kentucky, 47,250 square miles.

5. The western coal-field, including the coal-producing areas of Iowa, Missouri, Nebraska, Kansas, Arkansas, Oklahoma and Texas, 98,700 square miles.

Coal-formations of cretaceous age occur in Dakota, Montana, Wyoming, Utah, Colorado and New Mexico. Coal-formations of tertiary age occur in Washington, Oregon, California and Alaska, but especially in Washington, where the amount of coal is large. The area of the cretaceous coal-fields is probably as great as that of the carboniferous coal-fields. The area of the tertiary coal-fields is not known. The amount of coal in these western fields has not been estimated. It perhaps equals that in the carboniferous system, though the quality of the coal is on the whole inferior.

The anthracite coal of the United States is derived chiefly from Pennsylvania. Colorado and New Mexico, however, produce some. Pennsylvania also leads in the production of soft coal. Semi-anthracite is mined in Arkansas. Extensive lignite fields are located in North Dakota. The best bituminous coal that can be made into coke is mined in the middle-Atlantic states.

Coal mining falls into two classes, open and closed working. Open working is employed when seams of coal are on or near the surface. It is a process of excavating and quarrying. In closed mining a vertical shaft is sunk from the surface to the coal seams, or a slope is dug into an outcropping inclined seam, or a horizontal tunnel is dug into the side of a hill until it reaches the coal. There are frequently compartments in shafts or slopes for compressed air pipes and elevator cages. The coal is cut from the seam by hand or with a cutting machine run by compressed air or electricity. The openings are lined with various forms of timber or masonry. In America, it is customary to dig the coal from a number of small rooms, also called chambers, stalls or boards, which are driven either square from or at an angle to the haulage ways. Pillars of coal are left as a support to the ground overhead, thus giving the method its name—chamber and pillar. Another method is called the long wall method. This provides for removal of all coal in the seam, the roof being allowed to settle behind. Care is taken to preserve haulage ways through the falling material.

It has been estimated that the total world reserve of coal amounts to some 7,397,500 million tons. See MINING; COKE; HEATING.

Coast-Defense. In 1885 the nation awoke to the fact that the fortifications that should protect our cities and prevent a foe from using our harbors as bases of warlike operations were absurdly weak—in many cases not strong enough to keep out a single line of battleships. Our navy had just been born, and we were without torpedo or other coast-defense vessels. In 1886 about 100 million dollars were appropriated to be spent in 10 years for coast defense; but for many years the matter was greatly neglected. To-day, however, it is believed that our principal ports and harbors are safe from any attack from the sea, even if our navy were driven from the ocean. The defences on the great lakes are comparatively weak, as our treaties with Great Britain prevent either country from maintaining more than a few small vessels upon these waters. The first plans for coast-defense relied largely on vessels of great gun-power and lying very low in the water, so as to offer a small target. These ships were expected to remain in the harbor to supplement the forts. But this type of harbor-defense is abandoned. The coast-defense forts are to all appearance nothing but grassy mounds of earth. The guns for the most part are of the disappearing type, presenting a target to the enemy only at the moment of firing. The latest form of coast-defense is the submarine ship of which we already have a few excellent examples.

Coast Range, a mountain range in California, extending from the Oregon boundary into Lower California. It is 30 to 40 miles wide, and is divided by the Bay of San Francisco. From the main range spurs reach out to the coast line, inclosing fertile valleys. The most noted are the Los Angeles, Santa Clara and Sonoma valleys. The highest peak is Mt. San Bernardino, 11,600 feet in height.

Coast-Survey, of the United States, is an undertaking of great importance. With a long and dangerous seacoast; with thousands of vessels yearly entering and leaving our ports; and with a great coasting trade, it is the duty of the nation to provide every means which science and skill can offer for pointing out the dangers of the coast. The coast-survey was founded for these objects. It furnishes accurate maps of the whole coast, including Alaska; it points out the site of, or suitable places for, lighthouses and beacons; it traces the ocean-currents along the shores; it studies the tides; it finds out the courses of the winds, the changes which take place at the entrance to harbors, the character of the bottom of the sea off the coast, etc. The first suggestion in the way of organizing a coast-survey was made in Jefferson's message to Congress in 1807; but work was not commenced until 1817. The large scope of the work, its accuracy, the quickness and cheapness with which results have been reached—taking much less time and costing much less than the British survey—have been largely due to its long-time superintendent, the late Prof. A. D. Bache. Besides the valuable scientific knowledge gained, many discoveries of great value to commerce have been made. Thus the entrance to Delaware Bay was found to be eight miles in error. Six dangerous shoals were found in one year near Nantucket, right in the track of trans-Atlantic ships and of the heavy coast-trade between the eastern and the southern states. A new channel, with two more feet of water than any other, was discovered in New York harbor. The reports on the tides and the Gulf Stream were also of the greatest value to commerce.

Co′balt. This chemical element has an atomic weight of 59. Its symbol is Co. It is a metal, very tenacious, but not commercially valuable except as the basis of certain brilliant paints, sometimes referred to as cobalt green and cobalt blue. It is often used to color glass blue and in the making of blue porcelains, etc. These colors are derived from the oxides of cobalt. The chloride of cobalt may be used as a sympathetic ink, *i.e.*, an ink which can be made to appear or disappear; for, when kept moist, the chloride remains invisible; but when dried before a fire, it quickly appears as blue ink. The metal is found pure in meteorites, but otherwise is found only in compounds, usually with arsenic or sulphur. It is not abundant, though widely distributed.

Cobalt, a noted mining center in the district of Nipissing, Ontario, Canada, lying just south of the arable lands of Lake Temiscaming. Discovered in 1904, it now has 25 producing and shipping mines, the owners of which have become very wealthy men. In 1904 the camp (largely in the one township of Coleman) produced 158 tons (silver) valued at $136,217; in 1905, 2144 tons valued at $1,473,196; in 1906, 5129 tons valued at $3,900,000. Over 14,000 tons were shipped in 1907 valued at $9,500,000. It is believed that the value of the shipments for 1908 will exceed $10,000,000. The mines are only beginning to be worked in a methodical, scientific way. The Nipissing, the O'Brien, the La Rose and the Coniagas are especially noted for their richness and extent. The district produces other valuable minerals besides silver, including cobalt, nickel and arsenic. Cobalt (the mineral which gives the town its name) is a comparatively rare mineral, used chiefly for coloring glass and fine china and pottery, but also for making paints and pigments. A greater variety of rare minerals has, it is said, been found in the broken reef that runs west from the St. Lawrence than in any other region in the world. Cobalt is 330 miles from Toronto, and is reached by the Grand Trunk Railway via North Bay. From five small veins which have been quite recently opened in an area less than a mile in length and half a mile in breadth, surrounding Cobalt station on the Temiscaming and Northern Ontario Railway, four hundred thousand dollars' worth of ore has been shipped. The records of this railway show 4663 tons of rich ore shipped in 1907. And this wonderful district is only on the threshold of development. In conjunction with the rich finds of silver ore there are found cobalt, nickel and arsenic.

Cobb, Howell, born in Georgia in 1815, became a lawyer, and was member of Congress from 1843 to 1851. In 1849 after a debate that lasted three weeks, he was elected speaker. This was a victory for the southern party, that sought to introduce slavery into California, which had been ceded by Mexico to the United States and was about to enter the Union as a state. In 1851 Cobb became governor of Georgia. He presided over the Congress that adopted the Confederate constitution, and on the outbreak of war he became major-general in the army of the south. After peace was declared, he bitterly opposed the policy of reconstruction until his death in 1868.

Cobbe, Frances Power, an English reformer, philanthropist and author, was born in Ireland, Dec. 4, 1822. Early in life she devoted herself to relief-work among women and to various reforms, by addresses, lectures and articles in the newspaper and periodical press. She has actively opposed vivisection, and for 18 years was honorary secretary of a society for the protection of animals from vivisection. She has also been a zealous worker in educational and philanthropic projects, and written extensively, from a Unitarian point of view tinged with rationalism, on theistic ethics and belief. Her chief writings embrace *Studies, Ethical and Social; Intuitive Morals; Religious Duty; Hopes of the Human Race; Duties of Women; Darwinism in Morals; A Faithless World; The Scientific Spirit of the Age;* etc. Her autobiography appeared in 1894, and her death occurred in 1904.

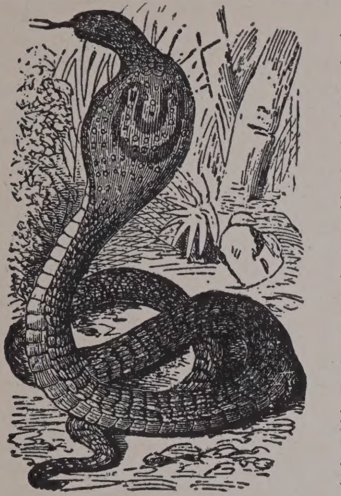
Cob'den, Richard, "the apostle of free trade," was born at Heyshott, England, June 3, 1804. After five miserable years in a "Dotheboys school," he was given a position in his uncle's wholesale warehouse in London. After setting up for himself in the calico-printing business, he settled at Manchester in 1832. He was an energetic member of the Manchester Anti-Corn Law League, which opposed all duties on corn [wheat]. Becoming a member of Parliament, his speeches in the house and lectures throughout the country had great effect in bringing about the repeal of the corn-laws in 1846. In politics he was against the Crimean War, declined to serve under Palmerston as president of the board of trade, and arranged the treaty of commerce with France in 1860. Throughout his life he was earnest and simple-minded. In Parliament he was the master of clear, persuasive speech, and was the champion of free trade, peace, non-intervention and economy. He died on April 2, 1865.

Coblenz or **Koblenz** (*kō'blĕnts*), a city of Prussia, at the junction of the Rhine and the Moselle. It is strongly fortified by a wall and a series of forts, especially the castle Ehrenbreitstein, which was built by Emperor Julian and is deemed almost unassailable. The defensive works will shelter 100,000 men, though 5,000 are deemed enough to defend them. The magazines are designed to hold provisions for 8,000 men for ten years, and the cisterns to hold a three years' supply of water. The old church of St. Castor, built in 836, and its palace are the chief features of the city. Its main trade is in champagne and cigars. Coblenz became a part of Prussia in 1815. Population, 53,897.

Cobourg (*kō'bo͞org*), a favorite summer resort, 70 miles east of Toronto on Lake Ontario. Population, 5,000. Some beautiful homes have been erected by wealthy Americans who spend the summer there.

Its public buildings, churches, banks, schools and hotels are unusually attractive. It is the best harbor on the north shore of Lake Ontario. The Grand Trunk Railway has a daily ferry-service to Rochester, New York.

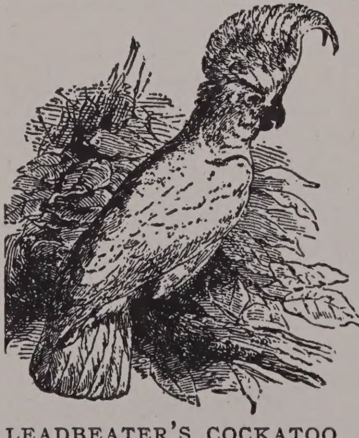
Cobra de Capello (*kō′brȧ dȧ̂ kȧ-pĕl′lō̂*), the hooded snake of India, the most dreaded of the serpent tribe. Its poison fangs stand out, not like those of the rattlesnake at the time of striking, but permanently. There is a more venomous snake in India, but the cobra is more abundant and is extremely poisonous. About 25,000 deaths occur annually in the Indian peninsula from cobra bites. Its usual food is small reptiles, frogs, fish, etc., and it may climb to roofs or among branches or take to the water in search of food. Its natural enemies are the jungle-fowl, which devours the young, and the ichneumon, which can overcome the full-grown animals. When excited, the hood (see illustration) is expanded by dilating the neck. The colors of this serpent vary from brownish olive to black, with white or black spots (usually two) on the hood. The natives hold it in superstitious reverence, and it is a favorite with the snake-charmers of India.


COBRA

Cochin=China (*kō′chĭn chī′nȧ*), the maritime region of Anam, an Asiatic possession (since 1861) of France, lies along the east coast of Indo-China, washed by the China Sea. The area of the whole of the Indo-Chinese dependencies of France is about 255,000 square miles, with a population of 18 1-4 millions. It is divided into four main parts: Tonquin in the north, south of it Anam proper, south of Anam, Cochin-China proper, and in the far southeast, Champa. The capital is Hué. The delta-lands of Tonquin are very fertile, yielding two harvests a year. They are formed by the red soil carried down by the main river of the country, the Song-coi, which is rapidly enlarging the delta. Hanoi, a seaport built by the Chinese in the 18th century, is now 100 miles inland. Everywhere the delta-lands are crossed by deep dikes, many miles in length, from 20 to 30 feet high, and broad enough at the top for three carriages to drive abreast. The people of the hills are taller and stronger than those of the coast, who are small and so inactive that "lazy as an Anamese" has become a proverb. The great crop is rice, which is also the main food, though the people are fond of snakes, locusts, rats and dogs. The emperor is a despot, and the bastinado, mutilation and torture are regular punishments. All men between 18 and 60 must serve in the army, and the field-work is usually left to the women.

Cochin-China, which has an area of 23,160 square miles, was conquered by China in 214 B. C., gained its independence in 929 A. D., and was successful in a second war with China in 1403–28. In 1517 came the Portuguese, and soon after the Dutch; in 1789 appeared the French, who have slowly made themselves masters, so that now the whole country is a dependency of France. The capital is Saigon, and the chief products are rice, cotton, silk, hides, fish, pepper and copra. Population is about 2,226,935, and the population of Saigon the capital is 47,577. See ANAM and CAMBODIA.

Cochineal. A dyestuff, made from the cochineal insect, scarlet or crimson in color. From the same source are derived the carmine and lake paints or pigments. Of late years this coloring matter is of less importance, because of the use of aniline dyes which are prepared cheaply by chemicals from coal-tar. The home of the insect is Mexico and Central America. It is very small, a pound of cochineal containing about 70,000 dried insects. It feeds on the cactus, and is secured by taking branches of that plant and giving the females an opportunity to lay their eggs. These little eggs are hatched in enormous numbers, and when this second generation of insects is just ready to lay the little creatures are gathered in trays and placed in a hot oven. They are later dried thoroughly in the sun. From the dead bodies 10% of pure dye is secured. The insect has been successfully introduced into Java and Australia.


LEADBEATER'S COCKATOO

Cockatoo, any member of a family of parrot-like birds inhabiting the East Indian archipelago, Guinea and Australia. There is in most species a crown of feathers on the head, which are raised when the bird is excited, but quite smooth when it is quiet. The birds live in flocks in the tops of tall trees, and make a note sounding like their name, but they are also great screamers. They are very common in zoological gardens. The prevailing color of plumage is white, but there are a yellow-crested and a pink-crested cockatoo, the latter with feathers pink above and almost crimson below. There is also a black cockatoo.

Cock'rell, Francis Marion, a member of the U. S. senate, was born in Johnson County, Missouri, in 1834. He practised law, served in the Confederate army during the Civil War, and attained the rank of brigadier-general. As a senator he was quite prominent upon committees dealing with appropriations, military affairs and industrial expositions. He was appointed on the inter-state commerce commission in 1905. He died in 1915.

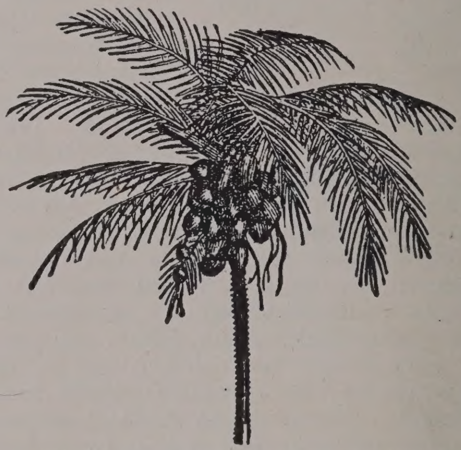
Cockroaches. The cockroach or roach is a member of the order *Orthoptera* or straight-winged insects, and is thus closely related to locusts, grasshoppers and crickets, rather than to beetles. Fossil roaches are found in such numbers in the lower coal-beds as to suggest that they were the most common insects during that warm moist period of the earth's history. They still follow warmth and moisture, and for this reason have attached themselves to man. There are four species that especially infest our houses, the German, the American, the Oriental and the Australian.

They are smooth, brownish insects, broad and very flat-bodied, which enables them to spend the day between boards or otherwise hidden. The head is bent under the body, and the eyes turn downward. The antennæ or feelers take the place of noses and ears, apparently, and are very long, about the length of the body and very slender, having 100 or more joints. The males commonly have two pairs of wings. The female commonly has shorter wings or none at all. They come out to feast by night. So greedy are they that they have been known to bite through book covers and gilt lettering so as to get at the paste beneath. They leave an offensive odor on all over which they pass, and even flavor dishes so that the odor becomes perceptible only when the food cooked therein is tasted.

Though roaches are excellent scavengers and are reputed to destroy bed-bugs, they are so disgusting that it is important to unite in their destruction. They will invade a house which is free from them, so that concerted action is necessary. They are on their guard against most poisons, but can to a great extent be destroyed by the use of pyrethrum powder. This, however, spoils the shelves on which it is placed, and the roaches are only paralyzed by it in many cases, and must be swept up and burnt in the morning, before they recover. Phosphorus paste, of which many preparations are sold under patents, is destructive to roaches, but is troublesome and not free from danger. Wherever a room can be made airtight, *fumigation* by burning pyrethrum is very effective.

Co'coa, a substance obtained from the seeds of *Theobroma Cacao*, a member of the *Sterculia* family. This particular species is native to tropical America. The cucumber-like fruit contains numerous seeds which are called cocoa beans. From these beans the cocoa is obtained, and in its refinement it appears in commerce under the name of chocolate.

Co'coanut, a species of the genus *Cocos* (*C. nucifera*), belonging to the palm family. It is native to certain islands of the Indian Ocean, growing naturally on the sea-shore or in its immediate vicinity, but cocoanut plantations are common throughout the tropics. A tough fibrous husk incloses the nut, whose hard shell is lined with the food-material. The so-called milk in the large cavity is simply tissue which has not developed into compact cells. Not only is the fruit itself an article of commerce, but the oil extracted from the nuts, which is known as cocoa-butter. This is one of the tallest and most ornamental of the palms, the columnar trunk sometimes rising to a height of 100 feet and being crowned by a cluster of leaves from 10 to 20 feet long. As a rule it is found near the sea-coast. The tree begins to bear fruit when about eight years old; the average annual yield is from 90 to 100 nuts; and the tree remains productive many years. The embryo finds outlet in the largest of the three black scars at one end of the shell. The cocoanut is propagated only by seeds.



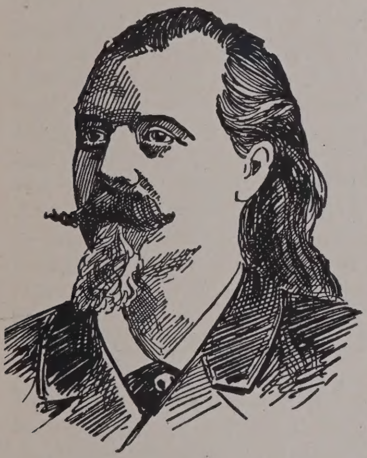
COCOANUT PALM WITH FRUIT

Cocoon (*ko-kōōn'*). See CATERPILLAR.

Cod, a common salt-water food-fish related to the haddock. The average weight of those taken about Cape Cod is about ten pounds, but they may reach the exceptional weight of one hundred and sixty pounds. One weighing 60 pounds is considered a large fish. They live in the cold waters of the north-temperate seas, and extend into the Arctic Circle. They are remarkable eaters; not only do they eat very many fish, but they swallow shelled mollusks whole, and rare shells have been collected from the cod's stomach. They lay an immense number of eggs—as many as 9,000,000 from a 75-pound fish. The cod are caught with hook and line, and great numbers are salted as food. Cod-liver oil is a well-known medicine.

Codlin=Moth (*Carpocapsa pomonella* of Linnæus), according to Comstock "the best known and probably the most important insect-enemy of the fruit-grower," is gray with bronze markings, and has a wing-spread of less than an inch across. The eggs are laid in the middle of the blossom, and hatch into tiny maggots, which eat to the center of the young apple. When the apple drops, as it does prematurely, the grown larva crawls out and into the ground. Later it spins its cocoon under the scales of the bark of the apple-trees. Large numbers are destroyed while in this stage by woodpeckers. The larvæ of the second brood are carried late in the fall to where apples are stored for the winter, and live to the next spring. It is estimated that this moth causes $7,000,000 damage yearly in Illinois, Nebraska and New York. Preventive: Paris green or lead arsenate sprayed on the trees just as the blossoms fall, with a repetition of the treatment in a few days if rainy weather follows. (See Spraying.)

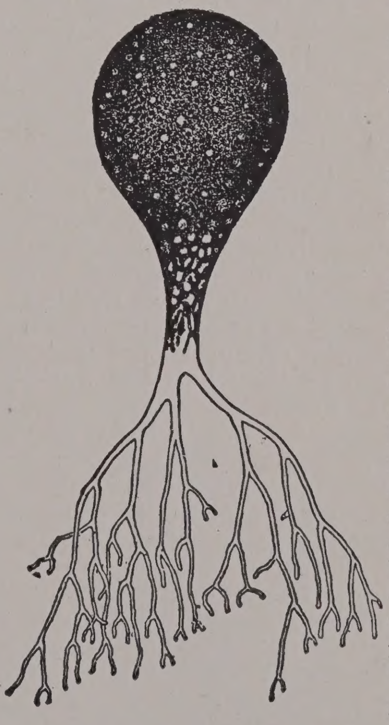
Cody, William Frederick, an American frontiersman and scout, was born in Iowa, Feb. 26, 1846. He was familiarly known as Buffalo Bill, having earned the sobriquet by having killed, in 18 months (1867-8), over 4,000 buffaloes on the plains, to feed the laborers engaged in the construction of the Kansas Pacific Railroad. He for some time in 1868-72 acted as government scout and guide, and served in the field-operations against the Sioux and Cheyennes. In the battle of Indian Creek he killed Yellow Hand, the Cheyenne chief, in a hand-to-hand fight; and was also in the battle of Wounded Knee. In 1872 he was a member of the Nebraska legislature. In 1888 he organized what was known as the Wild-West Show, an exhibition of Indians, rough-riders, cow-boys and frontiersmen, with whom he made tours of the chief towns of the United States and Europe. He is a joint author of *The Great Salt Lake Trail.* He died Jan. 10, 1917.



W. F. CODY

Cœlenterata (*sē-len′ter-ā′ tä*), the subkingdom of animals containing the hydra, sea-anemone, jelly-fish and coral animals. With the exception of the fresh-water hydra and a rare jelly-fish, they all inhabit salt water. There are several types of animals embraced within this subkingdom. The hydroids are colonial and branching. They have often been collected and pressed under the name of sea-moss. The polyps or individuals living on the branches are of two kinds: the feeding and the medusoids. The latter are modified polyps. When mature, they resemble jelly-fish and are set free, swimming about independently. They bear the eggs and sperms. When the eggs develop, they are converted into the branched colonial forms and as a consequence, there is an alternation of generations. The medusoids lead naturally to the jelly-fish, which are free swimming and of diversified form. Many of them have an umbrella-shaped disc with tentacles and other structures hanging from it. Formerly they were called medusæ. The coral-animals are both solitary and colonial or branching. All of these animals have lasso-cells, containing minute darts or threads which are capable of being discharged. In some forms they are long enough to penetrate the human skin, and these can inflict severe stings. The *Ctenophora* or comb-bearers make a separate class. See Coral, Hydra, Jelly-Fish,

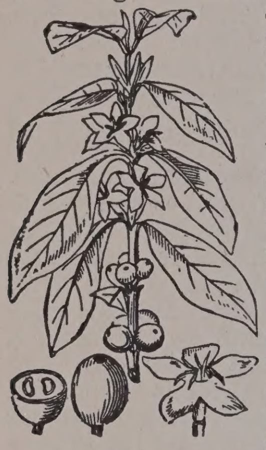
Cœnocyte (*sē′no-sīt*), a plant body which contains no dividing walls, but consists of a single body cavity surrounded by the general bounding wall. Such bodies contain numerous nuclei, and may be regarded as being composed of just as many cells, which have not formed walls about themselves. The cœnocytic body is chiefly displayed by the siphon forms among the green algæ and by the *Phycomycetes* among the *Fungi.*



BOTRYDIUM, SHOWING A CŒNOCYTIC BODY

Coffee, the seed of the coffee-tree and also a well-known drink made from the same. The coffee-tree is a native of Abyssinia, Arabia and many parts of Africa.

It is extensively grown in Brazil and other northern states of the South American continent, as also in Mexico, Central America, Haiti, San Domingo and the East Indies. In a wild state it is a slender tree from 15 to 25 feet in height. When grown in plantations, it is not allowed to become more than six to ten feet high, with many branches. The fruit is dark scarlet when ripe, with two cells, having one seed each. The leaves are evergreen, and the flowers white. The coffee-tree thrives best in warm, moist lands; though it grows at Quito, Peru, at an altitude of 1,000 feet, where there never is any frost. The tree yields its first crop in the third year; from a full-grown tree, its yield may amount to a pound of coffee-beans. Three gatherings are made in the year, when this process takes place: The beans are placed on a mat to dry by the sun's rays; the pulp and skin are taken off by rollers; and the coffee is cleaned by winnowing. The main difference in price and quality of the product is due to care bestowed in preparing it in different places. The chief kinds are Mocha, a small, grayish-green bean; Java, a large, yellow bean; Jamaica, smaller and greenish; Rio, pale-yellow and whitish. Rio and Maracaibo are the cheaper, and Java, Mocha and Sunda are the more expensive brands. Coffee allays hunger, exhilarates and refreshes. According to some authorities it also lessens the amount of wear and tear of tissue in the waste in the animal frame which is going on every moment. The consumption of coffee in the United States in 1910 was 873,983,689 pounds, an average of 9.33 pounds *per capita*, and the average import-price per pound was 7.9 cents. More than half the world's coffee is produced in Brazil.



COFFEE-PLANT

Coffee Republic. See Costa Rica.

Coffer-Dam is a temporary dam built around a place to be excavated for a foundation, so that the water can be kept pumped out. It is commonly constructed by driving piles about the given area and using sheathing of various kinds to make a water-tight wall. Coffer-dams are not ordinarily used in water over 25 feet deep. For deeper water caissons are used. See Caisson.

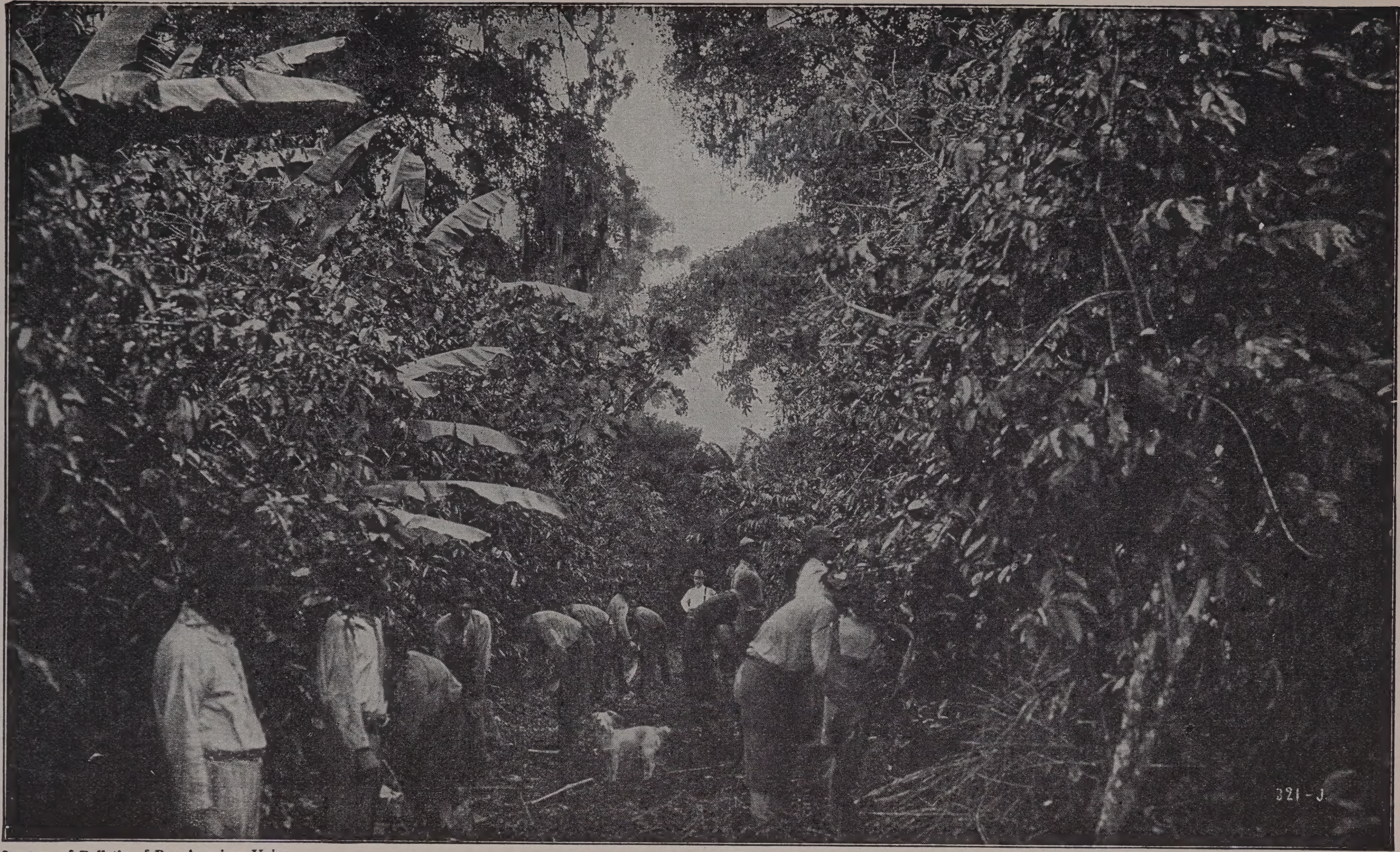
Cohoes (*kō̍-hōz′*), a flourishing, manufacturing city in New York state, on the Hudson, at the mouth of the Mohawk, and also on the State Barge Canal. It has six large cotton-mills, and some 30 knitting-mills with a number of other factories. Population, 24,709.

Coin and **Coinage.** See Mint.

Coke, a fuel got by heating coal in confined places. This is done sometimes in heaps, just as charcoal is made from wood, but oftener in ovens. It is also made when coal-gas is manufactured, being left after the gas is driven off. Coke is a hard, brittle, porous solid, with a steel-gray glint, and it does not readily soil the hands when handled. It is mainly valued for the great heat it gives off and its freedom from smoke when burning. Moreover, it does not become pasty in the fire while some of the sulphur of the coal is driven off; all these qualities make it very useful in smelting and refining metals. Coal yields about 70 per cent. of coke.

Colbert (*kôl′bâr′*), **Jean Baptiste,** one of the greatest of French statesmen, was born at Rheims, France, in 1619. In 1651 he entered the service of the great minister Mazarin. On his deathbed Mazarin warmly recommended Colbert to Louis XIV. "I owe you everything," said he, "but I pay my debt to your majesty by giving you Colbert." It was in 1661 that Colbert became chief minister to Louis XIV. He at once began to improve the ruinous condition of the finances. So thorough was the change which he brought about, that in ten years the yearly revenue (net) was 77,000,000 livres, when before it had been only 32,000,000 livres. But his reforms did not stop here. Farming, business, roads, canals and French colonies all felt his energetic hand. He found France with a few old rotten ships, and in a few years provided her with one of the strongest navies in the world. He also was a friend to all men of learning. In short, Colbert was the patron of industry, commerce, art, science and literature, the founder of a new epoch in France. His aim was to raise the power of France; but all he accomplished was undone by the wars of Louis and his spendthrift court. He died at Paris in 1683.

Col′borne, Sir John, born in England in 1788, was educated at Christ's Hospital (the Bluecoat School) and Winchester College. He entered the army in 1794 and saw active service in Egypt, Sicily, Portugal and elsewhere. In 1828 he was appointed lieutenant-governor of Upper Canada (now Ontario). Greatly interested in education, he founded Upper Canada College which has for many years been one of the most important educational institutions in Canada. Owing to the agitation by William Lyon Mackenzie his term of office was one of stress and storm. He later became administrator of Lower Canada and suppressed the Papineau rebellion. He was subsequently made governor of the Ionian Islands, and later attained the highest military rank, that of Field-Marshal. As Lord Seaton he died in England in 1863.



Courtesy of Bulletin of Pan American Union

A COFFEE PLANTATION IN COSTA RICA.

Showing trees twenty-five feet in height. In most large plantations they are allowed to grow not more than ten feet high. The broad leaves here seen are those of a banana tree.

Courtesy of Bulletin of Pan American Union

YOUNG COFFEE TREES IN BLOOM.

The blossoms are something like the jessamine in form and scent. The blossoms last only about three days. The rich fragrance can be detected by incoming voyagers three miles from land. The coffee trees begin to bear two to four years after they are transplanted from the nursery.

Courtesy of Bulletin of Pan American Union

A COFFEE PLANTATION IN BRAZIL.

In the single state of São Paulo, Brazil, there are growing 700 million coffee trees, producing annually about three-quarters of the world's coffee crop. Miles and miles of coffee trees stretch away as far as the eye can reach.

Coffe at [illegible]
Photographed by J F Sch[illegible]

Courtesy of Bulletin of Pan American Union

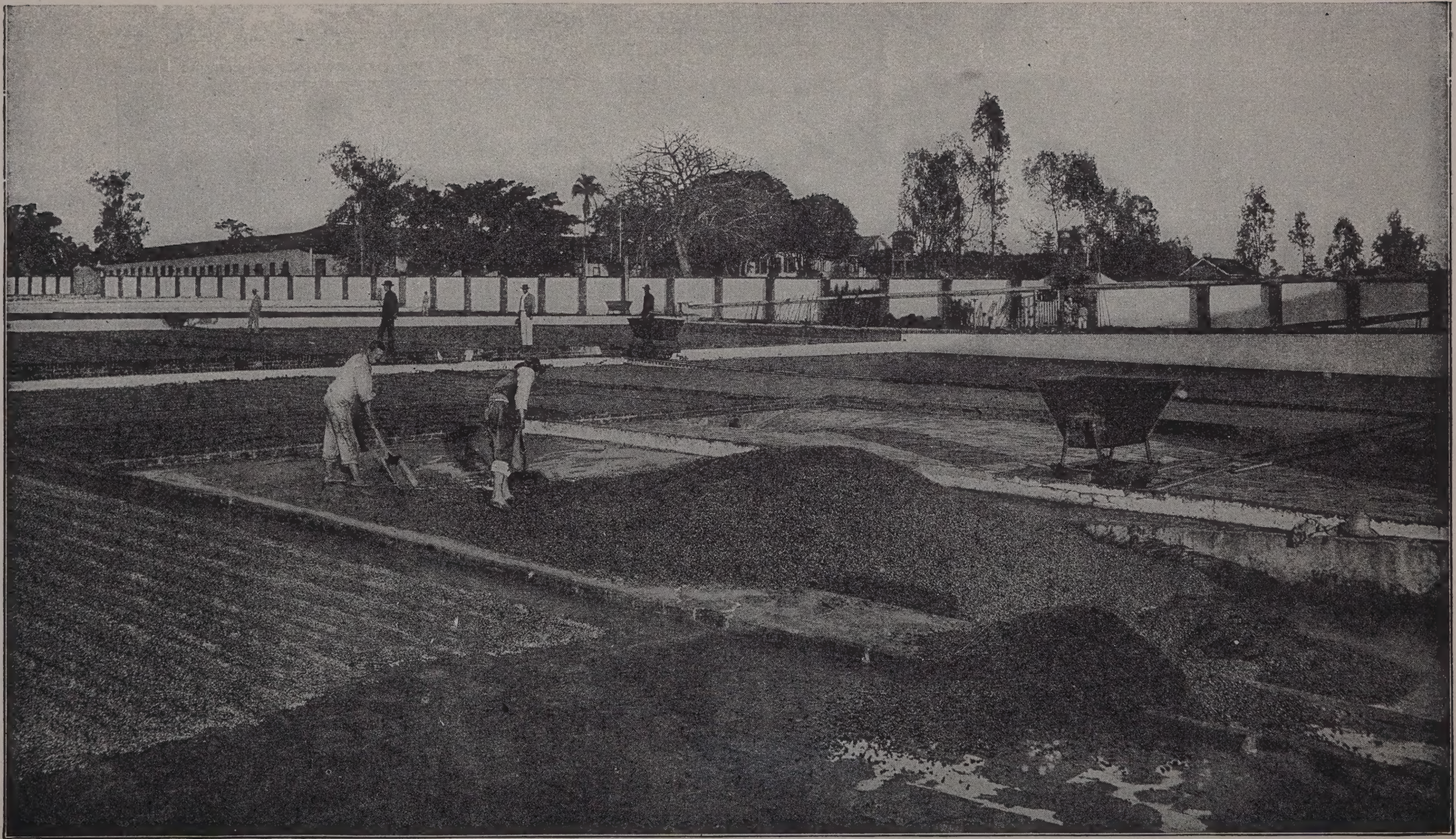
NEAR VIEW OF COFFEE TREE SHOWING FRUIT.

When ripe the fruit is red, and looks something like a cranberry. The coffee we buy is the seed of this berry. There are usually two seeds in a berry. Under the outer skin is a sticky pulp which incloses the seeds or beans, and these beans are coated with a coarse husk called "parchment," and under this is a very thin jacket known as the "silver-skin.'

Courtesy of Bulletin of Pan American Union

PICKING COFFEE IN BRAZIL.

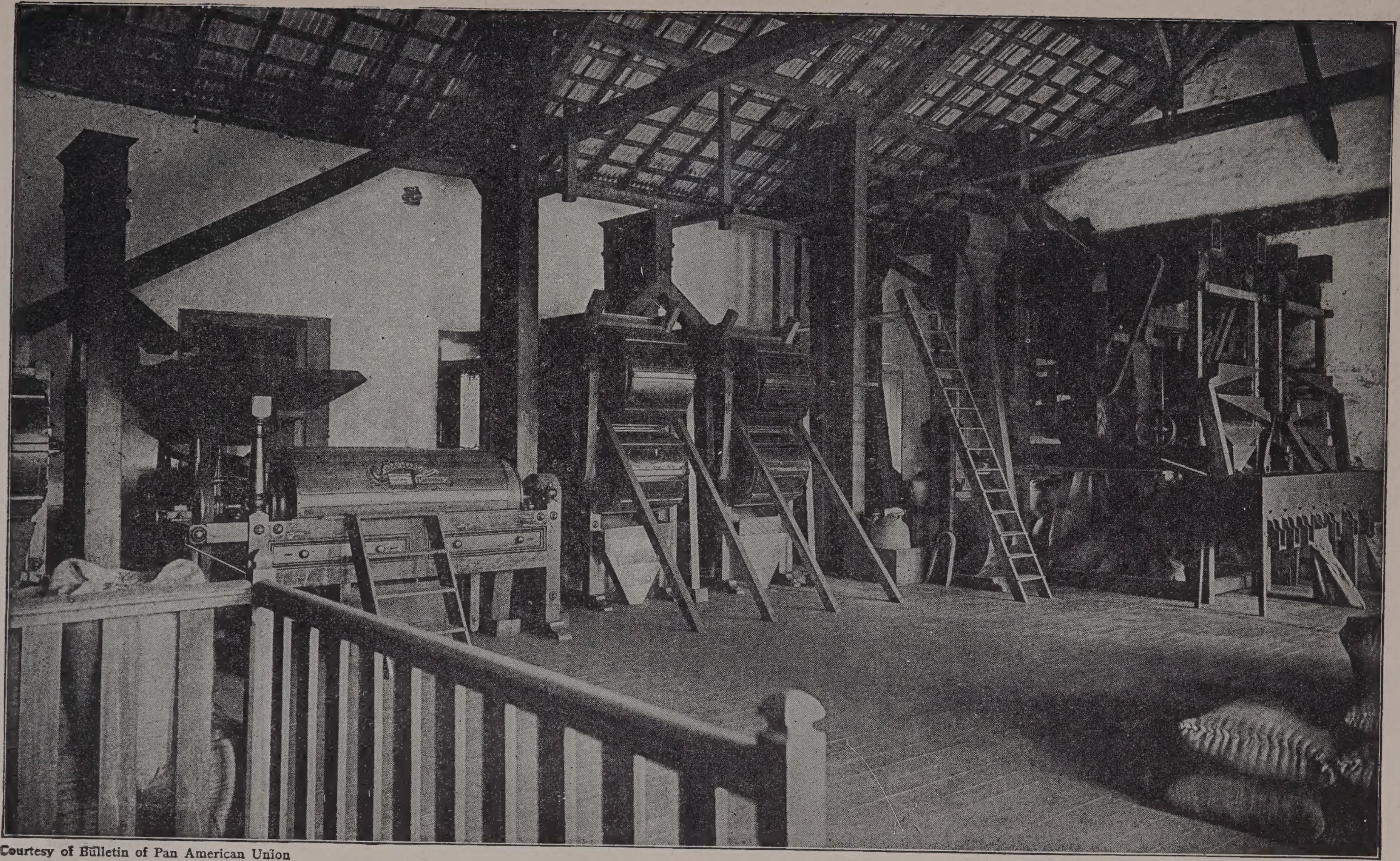
The berries are stripped from the boughs by hand and, with many leaves and twigs, let fall to the ground. Then they are raked together, the leaves and twigs separated, and the berries packed in sacks. After being washed clean the berries are carried in water to the pulping machine which crushes and loosens the pulp. The wet mass of beans and pulp then passes through a perforated revolving cylinder which separates the beans from the pulp. This is what is called the "wet system."



Courtesy of Bulletin of Pan American Union

DRYING GROUNDS.

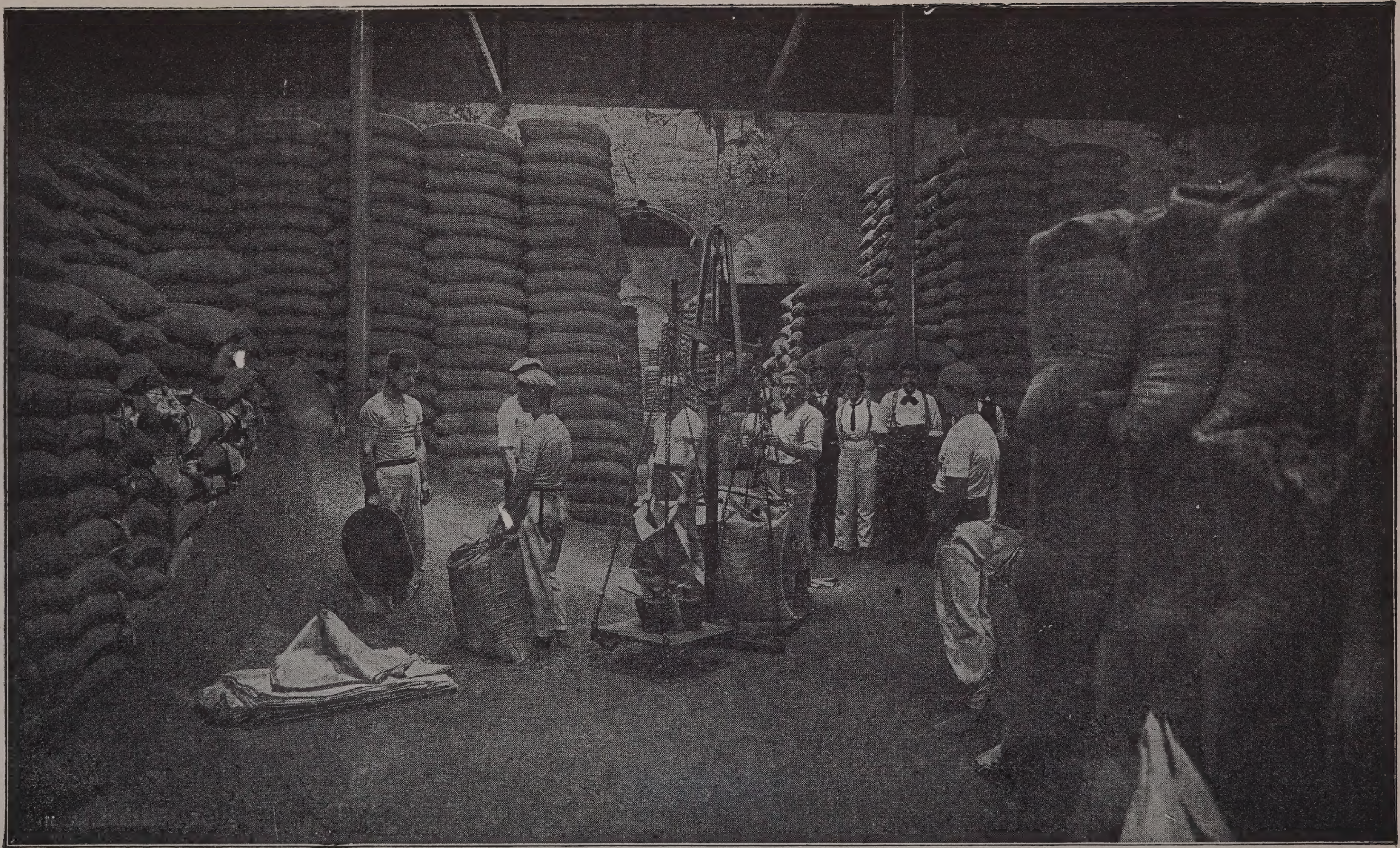
After passing into a fermentation basin, where any bit of pulp remaining is loosened and washed out, the beans are carried to the drying grounds. These are paved with brick or tile on which the beans are spread. Here constant watch and care are required, the beans being stirred to give uniform heat and ventilation, so that they do not dry too rapidly or too slowly.



Courtesy of Bulletin of Pan American Union

CLEANSING.

When dry the beans are taken to the machine for cleaning and hulling. A blower carries off the dust; then in the hulling machine the beans pass between corrugated surfaces, where by friction the inner coverings are loosened, and a second blower throws out the hulls and dust. By machinery the beans are then sorted as to size and weight, and from the last machine they fall into bags for shipment.



Courtesy of Bulletin of Pan American Union

PREPARING FOR SHIPMENT.

This is a scene in a shipping warehouse in the port of Santos, Brazil. The coffee is being weighed and made ready for loading on the steamers for shipment to Europe and the United States. For miles the docks of Santos are lined with steamers, flying the flags of many nations, all waiting to load coffee.

Cold Harbor, a village in Virginia, nine miles northeast of Richmond, where a bloody battle was fought, June 3, 1864, between the Federal army under Grant and the Confederate army under Lee. Lee held a strong position, having his entire line covered with earthworks. In the early morning the Federal line advanced in a grand assault on the Confederate works. They were obliged to pass over a naked plain covered by the Confederate guns. Bravely and swiftly they advanced, only, however, to be swept down by the enemy's fire. In less than an hour after the first volley was fired 6,000 Union soldiers lay on the ground dead or wounded, and the assault failed. The attack was not renewed, and at night Lee, in turn, assaulted the Federal lines, but was repulsed.

Cold Storage. Food may be preserved either by some chemical change made in it or by keeping out the bacteria of decomposition or by cold. The first method, which includes smoking and the use of large quantities of sugar, has the disadvantage of making the food less wholesome. The second method depends upon the fact that bacteria are kept out with the air, and requires that the bacteria present in the food or vessel be first destroyed, usually by prolonged boiling. By this method the food loses taste, in most cases. Cold storage depends upon the fact that below a certain temperature the bacteria of decomposition cannot work, though they may continue alive. A mammoth's flesh was preserved in the snows of Siberia for probably 20,000 years or more; and when found the dogs ate the flesh. Cold storage is the best method of preserving food. In 1867 the first refrigerator-car ran from Chicago to New York with a load of beef; it was a success, and enormous quantities of meat are now sent east in this way. The butchers in New York and other cities are able by the same method to keep the meat a long time after receiving it. Meat is now sent across the Atlantic in cold storage, especially to England, thus saving the expense and the risks of sending live animals. For about 25 years mutton has been sent in ever-increasing quantities from New Zealand and Australia to England by cold storage, with excellent results to all concerned. Fruits are now sent in refrigerator-cars from California and the south to all parts of the country. Bananas are thus packed, and the heat regulated on the journey, so that the bananas arrive at their destination at just the required degree of ripeness; for cold prevents ripening as well as decay. The cars are built double, with ice at each end, and a fan turned by the forward motion of the car keeps the air circulating over the ice to the meat and back again. The art of cold storage was neglected until the American people developed it into a great industry and common practice.

Cold Wave. From time to time great masses of air that have been chilled by the cold soil of northern Canada flow southward over the United States. Such cold waves, as they are called by the United States weather-bureau, usually cause a sudden fall in the temperature to the extent of at least 20°. The mass of cold air, being dense, usually lies near to the surface of the ground. It pushes its way beneath the less dense air of the south, which curls and rises away before it. The clouds which mark the advance of a cold wave, and often bring snow, seem to be caused by the cooling of the southern air, so that it can no longer contain so much water-vapor. A cold wave will sometimes reach even Mexico, where it is known as the *Norte*.

Cole, Thomas, an American painter, was born at Bolton-le Moors, England, Feb. 1, 1801. At Steubenville, O., where his father settled after emigrating to America, the sight of a wandering portrait-painter, with his canvas and colors, made him decide to become a painter. He painted portraits in several Ohio cities with no success, after which he set up as a landscape-painter at Philadelphia in 1823. Here he had a hard time, glad even to ornament chairs for a living. But in 1825 he painted several landscapes from sketches he had made in the Catskills, which gave him a name among artists. Prosperity at once followed and never afterward forsook him. Among his finest pictures are *Mt. Ætna*, *View of the White Mountains* and *The Voyage of Life*, the last a series of four pictures representing childhood, youth, manhood and old age. He died at Catskill, N. Y., Feb. 11, 1848.

Coleridge (*kōl'rĭj*), **John Duke, Lord,** son of a nephew of the poet, was born in 1820, and graduated at Oxford. He sat in Parliament from 1865 to 1873, where he was solicitor-general and attorney-general under Gladstone. In 1880 he became lord-chief-justice of England. He died on June 14, 1894.

Coleridge, Samuel Taylor, an English poet, was born at Ottery St. Mary, England, Oct. 21, 1772. At the age of four he had read the *Arabian Nights*. Schooled at Christ's Hospital, where he was poorly fed and badly taught, he afterward became a wide reader, reading Homer for the mere fun of it; and here he had as a school-comrade Charles Lamb. Here he planted the seeds of his after ill-health by bathing in the river with his clothes on, and then joining in a game or reading without changing his garments. Entering Cambridge, he was known as a great talker, a gift in which he excelled throughout life. Careless and extravagant, he was so exercised over his money troubles, that he fled and enlisted in a dragoon-regiment under a false name. Later he was discovered by his friends and sent to Oxford, where he met Southey. In 1795 he lectured and even preached in the Unitarian chapels around Bristol, and founded a short-lived journal. Coleridge and Wordsworth early became fast friends, spending much time together. Their talks on poetry led to their jointly bringing out the *Lyrical Ballads* (1798), containing Coleridge's *Ancient Mariner*, and the little book marked a new departure in poetry. A year later appeared his translation of *Wallentstein*, one of his best bits of work. During these years, troubled with rheumatism and neuralgia, he began to use opium, and the habit grew and enslaved him. It ruined his health, was fatal to his imagination, and weakened his will. Very sad is his lament over his own decay in his beautiful ode on *Dejection*. He had before contributed to the London journals, and now began to issue a weekly paper, *The Friend*, which, however, lived but a few months. As a poet and philosopher Coleridge ranks high; while as a critic he is unsurpassed. Besides his poems, his finest works are, perhaps, *Biographia Literaria* and *Aids to Reflection*. He wrote but little poetry, but that little deserves to be printed on purple vellum and bound in covers of gold. He died at London, July 23, 1834.

Colfax (*kōl făks*), **Schuyler,** a vice-president of the United States, was born at New York, March 23, 1823. Removing to Indiana, he published a newspaper at South Bend, which he made the foremost Whig journal in the district. Chosen a representative to Congress by the newly-formed Republican party, in 1854, he remained a member until 1869 and was three times speaker. He was elected vice-president on the ticket with Grant in 1868. He died on Jan. 13, 1885.

Colleges, American. The course of study in our American colleges has been constantly enlarging and widening. The knowledge required for entering has also risen greatly, so that now colleges proper—as distinguished from the many high-schools and academies calling themselves colleges—furnish young men with an education fully equal to that of the undergraduate departments of English and German universities. The high conditions of admission are shown by the fact that 15 per cent. of the candidates for the freshman class at Harvard fail to pass the entrance examinations, while ten per cent. fail each year at Yale. Besides the regular course, almost all colleges offer the student, especially in the last two years of the course, elective studies, which, if he prefers, he can exchange for studies in the regular course. Training in writing and public speaking is also carried on, either under the direction of the faculty or in the exercises and debates of the literary societies and in the editing of college papers. Elective studies as a system were not introduced into Harvard till the accession of President Eliot (1869). They have since been widely adopted in other colleges. Practically all colleges grant aid to ambitious students of limited means, while teaching and tutoring or "coaching" often pay the whole of a student's expenses. Harvard bears the name of a Congregational clergyman. Princeton was founded to train up able ministers. And in fact, all the early colleges were founded for a like purpose. Many western colleges were also started as home-missionary schools. One feature of college life is its student-societies, open—most of them literary—and secret. The latter are often known as fraternities, with chapters in many colleges.

Athletics receive their full share of attention. Each college, usually each class, has its baseball-nine, football-eleven and boat-crew. Series of games are played with other colleges each year. The annual football game between Yale and Princeton, as also the annual game between Yale and Harvard, draws thousands of spectators, as does also the spring regatta between the Harvard and Yale crews, which is rowed on the Thames, at New London, Conn. Field-days, in which prizes are given to the winners in running, jumping, vaulting and other matches, are held in most colleges. Over half the colleges of the country have gymnasiums.

Colleges, Junior. The flooding of colleges and universities by freshmen and sophomores have been a severe strain on our higher institutions of learning, and has somewhat pressed upon the facilities which should be accorded to upper classmen. The crowding has its evil effects on those entering, also, for classes are necessarily large, and as a result a large number are dropped from school in a short time. To offer better opportunity for the freshman to adjust himself, the junior college has been organized.

It has been shown that nearly a year of high school work is repeated in one form or another by colleges the first two years. With all these facts in mind, it is not surprising to note the growth of the junior college movement. Well-conditioned high schools are adding two years' beyond the normal high school requirements, and many smaller colleges have given up their last two years' program. Private schools which have expanded their courses to include two years of college work are increasing. The movement in the state of Missouri, which is actively supported by the State University to relieve it of its strain, has grown very rapidly, and a number of state universities are in accord with the system. Already the Federal Bureau of Education presents standards from eight state universities. The American Association of Junior Colleges has been established, and is engaged in standardizing the quality of work.

Colleges for Women. The first institution in the world founded for the avowed purpose, among others, of extending the benefits of college education to women was Oberlin. Twenty years later, Horace Mann, the great educational reformer, founded Antioch College and in his inaugural address as its president took a strong position in favor of what is now known as co-education. At the present time fully nine-tenths of all colleges are co-educational. Another type of higher educational institution is that in which a college exclusively for women is affiliated with a college exclusively for men. Of these, Girton College in England, affiliated with Cambridge University, was the pioneer. In this country we have Radcliffe affiliated with Harvard and Barnard affiliated with Columbia, and a few others. The first college exclusively for women was founded by Matthew Vassar and opened to students in 1865. The purpose of institutions of this character, as expressed by Mr. Vassar, was to inaugurate a new era in the history and life of woman.

"I wish," he said in his address to the trustees, "to give one sex all the advantages too long monopolized by the other. Ours is, and is to be, an institution for women—not men. In all its labors, positions, rewards and hopes, the idea is the development and exposition, and the marshalling to the front and the preferment of women—of their powers on every side, demonstrative of their equality with men—demonstrative, indeed, of such capacities as in certain fixed directions surpass those of men. This, I conceive may be fully accomplished within the rational limits of true womanliness, and without the slightest hazard to the attractiveness of her character. We are defeated if we start upon the assumption that she has no powers save those she may derive, or imitate, from the other sex. We are defeated if we recognize the idea that she may not with every propriety, contribute to the world the benefits of the matured faculties which education evokes. We are especially defeated if we fail to express, by our acts, our practical belief in her pre-eminent powers as an instructor of her own sex."

In the development of opportunities for higher education the work of the women themselves has been very important. Mrs. Emma Willard established a school for young women at Middlebury, Vt., and in 1829, founded the famous Female Seminary at Troy. The joint efforts of Mary Lyon and Zilpah P. Grant led to the establishment in 1837 of Mount Holyoke College at South Hadley, Mass. Another name which occupies a prominent place in the history of higher education for women, both in the eastern and western states, is that of Catherine E. Beecher.

College Entrance-Examination Board, of the middle states and Maryland, was established in 1899 at the instigation of Nicholas Murray Butler to obviate the difficulties arising from the diversity of standards of admission required by the various colleges and universities throughout the country. It is composed of representatives of colleges and secondary schools in the Middle States and Maryland whose duties are to hold yearly a series of college entrance-examinations with uniform tests in the various subjects and to issue certificates based upon the results of these examinations. The examination-papers for each subject are made out by a committee of three (two college professors and one high-school instructor), and then revised by a committee made up of the original three members, together with five additional high-school teachers. The papers are then sent to the places where examinations are held, which now include nearly all the larger cities in the United States, and some cities in foreign countries. No candidate fails, unless judged unfit to pass by at least two examiners. The certificates issued by the board are now accepted by nearly all colleges of the United States. Pupils who fail may have their examination papers sent to the college which they wish to enter, and, if their standing is satisfactory to that institution, they may be admitted.

College, Going to. To raise the question whether or not one should go to college is much like questioning the advisability of one's doing much reading and thinking. There are, for various reasons, many persons from whom only a minimum amount of mental activity can be expected, and a meagre education must suffice for them. But, ordinarily, any one who finds it possible to go to college, or who has energy enough to make it possible, can profit greatly by going.

It is true that occasionally a successful, or even a college-bred, man opposes a college-course for his son, on the ground that such a course unfits one for business instead of helping him in it.

But, in general, one vital condition of success in life is a knowledge of what people have thought and done in the past: a knowledge of the principal problems that have confronted them and the ways in which they have been solved. This is one of the things that a good college-course attempts to give, and does give. It gives it in the study of literature, history, natural science, art and other subjects, the various studies representing nothing more than the main lines of human endeavor.

The college-course accomplishes this object much better now than it did 25 years ago. At that time nearly all students were expected to take much the same course, consisting of Latin, Greek and mathematics, no one of which subjects dealt extensively with the actual problems of life. But since that time many subjects have been introduced, such as sociology, domestic science, domestic art, manual training and educational psychology, because they deal with real issues; and most of the old lines of study have been so modified in content and method that they function much more than formerly. Therefore, as a result of a good college-course, to-day, one becomes reasonably well-informed in regard to modern problems, and he has such an interest in them that his mind is likely to be alert and active in regard to these and other problems in the future. He is then well-prepared to be identified with the workers of the world.

All this applies as well to college-education for young women as for young men. It is true that it used to be a question whether the ordinary college-course for young women, while it possessed many merits, did not to a considerable extent inculcate a distaste for home-keeping—a sad result, indeed. It tended to do this through neglect of the problems of the home, if in no more positive way. But that evil is now being rapidly remedied, just as are the somewhat similar but lesser evils in the men's colleges.

But knowledge of and interest in human problems are only some of the benefits of a college course. Any one who spends three or four years at college forms there many of his main friendships for life. It is an especially cultured, ambitious and able class of persons that one meets in college; and to cement enduring friendships there that one will often enjoy later is one of the chief objects of going to college. Many an adult suffers from lack of numerous well-educated and close friends. The suggestion follows from this fact that study should not be taken so seriously as to exclude social life at college.

The college graduate, just out of college, may feel his lack of preparation, and at first be forced to accept a very inferior position. But his superior training and associations will do much to advance him in the race to the top of the ladder if he is conscientious and diligent. As a bridge from the academic to the practical, a number of colleges operate on a plan whereby the student spends one-half his time at some shop, factory, or business in which he is interested, and one-half at school intensively studying the field or work of his interest. This method usually pays all expenses.

Many students of limited means are taking advantage of this method.

The selection of a good college is not an easy matter. A college that is very good for one person may not be desirable for another. Large colleges or universities possess the advantage over small ones of having more valuable equipments and of paying larger salaries to head-professors. But the difficulty with the large college is that the average student who attends it becomes lost in the mass. The lecture-plan is largely followed, and the classes are large, so that few responsibilities besides getting his lessons fall upon the ordinary student, and he has little or no personal contact with his instructors. Many of these, also, are poorly paid underlings, the head-professors, worth large salaries, working mainly with advanced students.

The small college, on the other hand, is very likely to secure a close contact between teacher and student, and each student is likely to feel more social responsibility. The difference is much the same as that between life in a great city and that in a small town. Any person having any vigor is likely to count for something in a small community; while only the born leaders are called forth in great cities. Many enlightened persons to-day are inclined to favor the small, reasonably well-equipped college to the very large one for the ordinary student.

But the college that one chooses should depend very much upon its strength in the line of study that one expects mainly to pursue. Moreover, whatever college one attends, the courses that he selects after he arrives there should not be determined solely by their titles. In fact, one should not choose a college chiefly either because it is small or large, but because there are certain persons of power there whom he wants and can have as his own instructors. The average instruction in any school or college is not very good, and frequently it is very poor. This is not due to any carelessness on the part of any class; it is true because good teaching is so difficult an art that it is not common. Not infrequently professors with national reputations are miserable instructors. They can attract students, but cannot hold them. In choosing a college, therefore, one should make sure, by correspondence with friends and in other ways, that his prospective teachers will be a source of inspiration. It makes little difference how learned the faculty as a whole is, or how many members it may contain; the very few men who will instruct a given student are practically the institution for that particular student.

The principal of the high-school nearest to you can probably be relied upon to give good advice about particulars in regard to going to college. By writing to the secretary cf any college one can obtain desired information, including the catalogue of the institution. See, also, COLLEGES, AMERICAN. F. M. MCMURRY.

College of the City of New York. In 1847–8 the city board of education established an institution for higher education which was at first known as the New York Free Academy. In 1866 it became a college, but it had no separate board of trustees until 1900, when the members of the board of education were replaced by the president of that board, acting with the president of the college and nine members chosen by the mayor. The college is now housed in splendid four-million-dollar buildings. A notable feature of its recent development has been its co-operation with the city. For example, the Department of Chemistry works with the municipal testing laboratories in the analysis of products purchased, with the Health Department in food analysis and sanitary inspection; the Department of Psychology acts with the Board of Education in the treatment of defective children.

Collenchyma (*kŏl-lĕn′kĭ-mȧ*) (in plants), a peculiar kind of tissue in many plants which serves as an elastic mechanical support and is developed immediately beneath the epidermis. It may be recognized in cross-sections by the fact that its cell-walls are thickened at the angles and have a characteristic pearly white luster.

Col′lingwood, a town of 7,291, one of the principal seaports on Georgian Bay (Ontario), beautifully located at the foot of the Blue Mountains. Enjoys a large grain trade with Chicago. A lumber center for all the ports on the north shore of Georgian Bay. It is on the Grand Trunk Railway, and the home port of the Northern Navigation Co., the steamers of which ply thence to the numerous lake-ports.

Col′lins, William, an English poet, was born at Chichester, Eng., Dec. 25, 1721. While a schoolboy be wrote his *Oriental Eclogues*, the most popular of his poems during his lifetime. After leaving Oxford he sought to make a living as an author in London, but his health and irregular ways of working unfitted him for success in such a life. His place among British poets is due to his *Odes*, which did not meet with the praise they deserved, when they first appeared, and were little valued even by such critics as Dr. Johnson and the poet Gray. In 1753 Collins' reason gave way, and he died on June 12, 1759, utterly unnoticed by a single newspaper of his time. His finest odes are, perhaps, *To Evening* and *The Passions*, though his most popular poems are that on the *Death of the Poet Thomson* and that beginning with "How sleep the brave."

Col′lins, William Wilkie, an English novelist, was born in London, Jan. 8, 1824. He had a good schooling, spent four years in business, and studied law. However, he turned to writing, first bringing out a life of his father, who was an eminent painter. His novels took high rank, and he became famous for devising deep and tangled plots for his stories. Hence he was called the Weird Concocter. His best novels are *The Woman in White*, *The New Magdalen*, *No Name*, *Poor Miss Finch*, *Armadale* and *The Moonstone*. He died in London, Sept. 23, 1889.

Collodion, a clear, colorless, gummy and highly inflammable liquid prepared by dissolving gun-cotton or pyroxylin in an equal-parts mixture of alcohol and ether. The gun-cotton is prepared from common cotton-wool by first boiling it in a solution of sodium carbonate, washing and drying it and, second, by placing tufts of it for eight or ten minutes in a mixture of nitric acid, water and sulphuric acid, and again washing and drying. Collodion was once extensively used in photography, and for some lines of that art is still used. It is very commonly used in surgery and chiropody, being especially valuable for scratches, chafings and minor cuts, as it keeps out poisonous substances and is not soluble in water. In one of its common commercial forms it is known as New Skin.

Coll′yer, Robert, was born at Keighley, England, Dec. 8, 1823. When a boy, he worked in a factory and afterward became a blacksmith. All his spare time was spent in educating himself. In 1850 he emigrated to America, settling in Shoemakertown, Pa., as a blacksmith and Methodist preacher. He afterward became pastor of a Unitarian church in Chicago, and later on of the Church of the Messiah in New York city. His sermons and books, especially his *Lectures to Young Men and Women*, have made him widely known, and the story of the rise of the blacksmith-preacher to a commanding position is familiar to all Americans. A literary society of Cornell University asked Mr. Collyer as a great favor to make them a horseshoe to hang in their hall, saying that Cornell boys could have no better stimulus than a piece of his handiwork always in sight. The preacher complied, and, asking a blacksmith to allow him to use his hammer, soon proved that he had not lost his skill. A picture of the scene has been painted, showing the white-haired old man with a blacksmith's apron tied over his clerical garb, fashioning a horseshoe on the anvil. He died Nov. 30, 1912.

Cologne (*kô-lōn′*), the capital of Rhenish Prussia, lies on the left bank of the Rhine. It is built in a half-circle, surrounded by the *Ringstrasse*, a 60-foot-wide boulevard Its old churches and buildings of the 11th 12th and 13th centuries, of Gothic, Romanesque and Transition styles of architecture, are of great interest. But its most famous building is the cathedral, one of the finest specimens of Gothic architecture in Europe. Said to date back to the reign of Charlemagne, it was burned in 1248; its rebuilding was begun in about 1270, and was carried on interruptedly till 1509. It was not until 1823 that work on it was recommenced, and the spires were not finished until 1880. Its entire cost was about $10,000,000 Cologne is a fortress of the first rank, detached forts encircling the city at a radius of four miles from the cathedral. It is well-placed for commerce, and many manufactures are carried on, among them the famous *eau-de-cologne*. The town was founded by the Ubii about 30 B. C. It became a part of the German empire in 870, was a member of the league of the Hansa towns in 1201, and, losing its independence, came under the sway of Prussia in 1801. Population of Cologne (Köln), 516,167.

Colombia (*kŏ-lŏm'bē-ä*), a South American republic, in the northwest corner of the continent, formerly including the Isthmus of Panama. It is washed by two oceans, and has 3,000 miles of coast and an area estimated at 500,000 square miles.

Surface. In the east are low, wide plains, and in the west three great ranges of the Andes spreading out like the ribs of a fan. The deep gorge through which the Patia River forces its way to the Pacific between steep walls from 10,000 to 12,000 feet in height forms the only break in the western range of the Andes from Darien to Patagonia.

Drainage. The rivers chiefly belong to the Atlantic system. The Ica, a feeder of the Amazon, provides quick and easy communication with Brazil. The Meta, an affluent of the Orinoco, affords navigation from near Bogotá to the Atlantic. The Magdalena-Cauca and the Atrato are more important, flowing nearly the length of the land, emptying into the Carribbean, and offering feasible communication to the tablelands.

Climate and Rainfall. In a day's journey one may encounter all the climates of the world, from the valleys choked with the rich growth of the tropics to the never-melting snows of the peaks. On the lowlands there are a dry and a rainy season, on the tablelands *two* of each. The rainfall is enormous, short rivers carrying almost continental volumes of water.

Natural Resources. Colombia distinctively is a mineral land. It abounds in alum, amber, amethysts, antimony, asphalt, coal, copper, emeralds, gold, iron, lead, limestone, magnesium, mercury, platinum, potash, salt, silver, soda. Spain in three centuries mined $300,000,000 of precious metals. The forests contain the aloe, brazilwood, cinchona, fustic, indigo, logwood, sarsaparilla, tolu balsam. The flora ranges from tropical varieties to alpine or arctic types.

Agriculture. On the loftier levels the crops of the temperate zone are cultivated; on the coast the banana, chocolate, cocoa, coffee, cotton, pepper, plantains, rice, sugar, tobacco and yams. On the plains cattle and horses are largely bred.

Manufactures and Commerce. Beyond basketmaking, dying, tanning and weaving, there are almost *no* manufactures, though distilleries, glassworks, cigar-factories and sulphuric-acid factories have been founded. Other manufactures include candles, iron, "panamas," shoes and soap. Excellent harbors on both coasts create a favorable situation for commerce, but the absence of good roads and railways hampers trade. Honda, the head of steam-navigation on the Magdalena, is connected by rail with Bogotá, and there are other short railroads, but they serve only the most limited areas. The principal exports are cinchona, coffee, cotton, hides, indigo; the minor items balsam, ipecac, ivory-nuts.

Education. Public instruction was in 1870 entrusted to the state, the schools reformed, teachers brought from Europe, and, anticipating the rest of South America, primary education made free. Higher education is provided by normal schools, state colleges, technical schools and a national university.

Races. The most densely populated part of the country is the high and healthy tableland of the eastern Cordilleras, where stands the capital, Bogotá (population 150,300), 8,694 feet above the sea. Of the natives, the Chibchas were the chief, being in civilization almost equal to the Peruvians. Many other tribes lived among the mountains, and about 200,000 survive. The population is made up of whites, Indian half-breeds, mulattoes and Zamboes (half negro and half Indian).

History. Amerigo Vespucci visited the northern coasts in 1499; three years later Columbus tried to found a Spanish colony in Panama; Balboa discovered the Pacific in 1513; and the native empire was overcome by Jimenez de Quesada in 1536. The Spaniards ruled badly, and reduced the Indians to serfdom. In 1819 was formed the Republic of Colombia, including what are now Colombia, Venezuela and Ecuador. The character of the people and the lack of close communication between districts far apart made the state unwieldly, and in 1831 the confederation fell to pieces. What now is Colombia was first called the Republic of New Granada, but took its present name in 1861. Its constitution is modeled after that of the United States. Besides Bogotá, the capital, the other chief towns are Cartagena (population 27,000) and Medellin (60,000). Panama was formerly a part of Colombia, but seceded in Nov., 1903. The secession was caused by the action of Colombia in refusing to ratify a treaty which had been negotiated with the United States for the construction of the Panama Canal, and the refusal was held to be directly opposed to the interests of Panama.

Colombo (*ko-lom'bo*), capital of Ceylon, named by the Portuguese after Columbus. It has a fine harbor, and within the town are two mission-colleges. Colombo was captured by the British in 1796. It has railway connection with Kandy, 60 miles to the northeast. Population, 158,228.

Colón (*kō̇-lōn'*), a seaport at the Atlantic entrance to the Panama Canal, forty-eight miles northwest of the city of Panama. Geographically within the Canal Zone, Colón is situated on Manzanillo Island. It has a deep but exposed harbor in Limón Bay, which has been improved by a breakwater from Toro Point, erected by the Canal Commission. Docking equipment is entirely modern. The canal authorities have laid out good streets, built a good hospital and improved the town in many ways. The gold-rush days of 1849 made a short route between the Atlantic and Pacific Oceans necessary for the California-bound prospectors. Consequently, Colón was founded in 1850 by the builders of the Panama Railroad, which was finished in 1855, and connected Colón with Panama. It was at first called "Aspinwall," in honor of William H. Aspinwall, one of the builders of the railroad, but the name was later changed by statute to "Colón," in honor of Christopher Columbus, who entered Limón Bay in 1502. Empress Eugenie in 1872 made the city a gift of a statue of Columbus, which stands at the mouth of the old French canal. When the Canal Commission began work in Colón, the population, consisting largely of Jamaica Negroes and natives of mixed Spanish, Indian and Negro blood, numbered about 3,000. In 1930, the population was 29,765.

See Panama; Panama Canal.

Colonna (*kō̂-lōn'nä*), **Vittoria,** an Italian poet, was born in Castello di Marino, near Rome, in 1490. She was a daughter of Fabrizio Colonna, Grand Constable of Naples, a distinguished officer. Her girlhood was passed in a high literary atmosphere. At the age of seventeen she was married to Francesco Ferrante d'Avalos, Marquis of Pescara, to whom she had been betrothed since she was four years old. There was no issue to the marriage, and Vittoria Colonna was gradually estranged from her husband. Her life became crowded with sorrow and bitter disappointment. Her earlier poems were written in a vein of melancholy, with tenderness for her absent husband. As he became famous in the service of Charles V, she found happiness in his glory. Religious exaltation colored her sonnets after the death of the Marquis in 1525. The poet Ariosto was another of her admirers. Her personality has been designated as one of the most beautiful in the age. She died in 1547.

Colony, properly a group of immigrants living in a foreign land under the laws and protection of the mother country; but the term is now used for any foreign dependencies of a country, from mere military posts such as Gibraltar to dominions such as Canada. The Greeks were an early colonizing people. Their first great colonizing movement followed the "Dorian migration," when the conquered people were driven out and forced to find new homes. Between the eighth and sixth centuries B.C., Greek colonization was due to home politics, overpopulation, and military and commercial interests. The Greek colony, however, was virtually independent. The Roman colony was more closely attached to the mother city, as it was a Roman policy that every conquered territory and every district where Romans settled should be an integral part of the Empire. After the fall of Rome, colonization languished for centuries. Venice and Genoa established commercial colonies, when at the height of their power. At the close of the Middle Ages, colonization began with renewed vigor, as the Portuguese and Spaniards began settlements. Neither of these countries tried to develop the agricultural resources of the territories they colonized, but used them for profitable trade with the mother country. The Portuguese had mere trading factories, while the Spaniards were deeply interested in mining. The stories of their colonial dependencies in the Americas are tales of oppression as they drained the possessions of all their wealth to enrich the officials in charge and the mother country. Great Britain practised a different policy, sending her colonists first. The New England colonies were her first great stronghold, followed by the southern colonies. Settlers were organized as privileged companies, given royal letters patent, grants and charters. The economic policy of the times demanded that the colonies send raw materials to the mother country and buy manufactured products from her, which was vigorously protested by the American colonies and eventually resulted in their independence. Their loss was compensated shortly by the great realm in India and the rapid growth of Canada and Australia. Spain's colonial possessions were at their height in the seventeenth century, declining in the eighteenth, and ending in the nineteenth. France, in 1763, by the Treaty of Paris, lost her American colonies and for a century did little colonizing until the Third Republic began a new policy in Africa, which was the principal scene of European colonization in the last quarter of the nineteenth century, and in the Far East. As the colonial possessions of Portugal were lost to the mother country, the Dutch founded on the ruins a colonial settlement of their own, part of which they lost to Great Britain at the time of the French Revolution. The United States entered into the field of colonial power by its victory over Spain, but has never called its insular possessions colonies. Germany had gained more than 1,000,000 square miles of colonies, chiefly in Africa, China and New Guinea, but lost these in the World War.

At present, dependencies of the United States include the Philippine Islands, Puerto Rico, the Canal Zone, Virgin Islands, Samoa, Guam, Wake and the Midway Islands. The British Empire includes large possessions in Asia, particularly India, Ceylon, Malaya, and in China; large possessions also in Africa and the West Indies; the great Dominion of Canada, the Dominion of Australia, and many islands. A new system, arising out of World

War treaties, is the mandatory system, which gave the German colonies and some others to various countries as mandates. British mandates, for instance, include South-West Africa, Tanganyika, New Guinea, Western Samoa, Nauru and Palestine. French colonial possessions include 4,681,789 square miles in Asia, Africa, America and Oceania. The Netherlands has considerable colonial wealth in the Dutch East Indies, Dutch Guiana, and Curaçao.

See ASIA; CHINA; FRANCE; GERMANY; GREAT BRITAIN; ITALY; JAPAN; THE NETHERLANDS; PORTUGAL; RUSSIA; SPAIN; THE UNITED STATES.

Color, a sensation produced by the impact on the eye of ether waves of varying lengths; also, popularly, any one of the hues, tints or shades produced in this manner. Color possesses no material existence as such. It is purely a sensation of light. The human eye is blind to light waves except those falling in the frequency scale of 392 billions to 757 billions a second, although scientists state that there are ranges of magnificent color which would transform the world into brilliancy if the human eye were capable of "seeing" them. Although the exact way in which the sensation of color is produced has not been determined, the Young-Helmholtz theory assumes that in the eye there are three sets of nerves corresponding to red, green and blue (or violet), and light waves reaching the retina stimulate these nerves in varying degrees. Color-blindness is the failure of one or more sets of these nerves to respond. The other main theory of color vision is the Hering theory, which postulates in the retina three substances affected by light, one by green and red, another by blue and yellow, and the third and most plentiful by black and white.

Color in objects takes different hues according to the absorption and reflection of the light rays by the object. Many objects reflect only certain kinds of rays, converting the others into heat energy or allowing them to pass through without absorption. In white light, then, their colors are determined by the combination of light rays which they reflect or transmit back to the eye. An object reflecting equally all rays appears white. The nearest condition to reflection of no rays whatever, is black. Thus, white is the proper combination of all colors; black is, as nearly as possible, the absence of all color. White materials are cool because they turn back the light rays; black materials are warm because they absorb them or let them through to the body. Grass is green because it absorbs all the light rays except the green. The color of the sky, of trailing smoke and of much lake water is caused by the scattering of light, as minute particles reflect the short blue waves and the other waves pass around them.

Cultural development from earliest times has found color important. As early as 2500 B.C., but six simple pigments were known and used in art, whereas now the artist may choose among several hundred tints and shades. The great physicist Newton was a pioneer in the study of light phenomena resulting in color. He first proved that white light contained many colors, which might be taken from the white light by prismatic refraction as in the rainbow; by diffraction as in the blue sky; or by absorption as in the green grass. Newton's spectrum consisted of seven colors, called primary, and including red, orange, yellow, green, blue, indigo and violet. A system of color study in vogue among artists of to-day uses a spectrum of six colors, omitting Newton's indigo, and dividing the six into three primary (red, yellow and blue), and three secondary (green, which is blue and yellow; orange, which is red and yellow; and violet or purple, which is red and blue). Other artists base their study on six colors—crimson, vermilion, green, violet, blue and yellow—and others on eight or twelve colors. All, however, use as basic colors the red, yellow and blue, and recognize the six colors into which the prism will break up a ray of white light. Combination of these in proper proportion, with the aid of white (presence of all color) or black (absence of all color) produces any hue, tint or shade desired.

Every color has a complementary color, that is, a color which when added to it will give white (or gray). If the color is one of the three primaries, its complement will be the other two; as, the complementary color of red is green (blue and yellow). If the color is one of the three secondaries, its complementary is the remaining primary, as the complementary color of orange (red and yellow) is blue. Every color has also three qualities, called constants. These are hue or tone of color, as olive green and jade green; value or luminosity, as light green and dark green; and purity or intensity, as a pure or spectral green and a broken or grayish green. Artists and interior decorators also divide colors into warm tones and cool, as they are near or far from sunlight colors. Thus, of the six spectral colors, red, yellow and orange are warm; blue, green and violet are cool.

All of the great schools of painting have used color in markedly individual ways. The Italians of the Renaissance obtained their effects by contrast, as in the reds and blues of the garments of their saints and Madonnas. Titian is noted for his use of a peculiar and luminous shade of red. The Flemish painters of the seventeenth century used harmonious but bright colors. Dutch painters, including Rembrandt, followed careful treatment of light and shade, and a more subdued color effect in general. Modern development in painting began with the reaction against the classic use of pure color, and the introduction of many tints and shades. Turner, in England, ushered in the new era. The Impressionists greatly enlarged the scale of color by their discovery of new tints. In America, Whistler is noted for his use of whites, blacks and grays. In contrast, Maxfield Parrish, a popular American painter, uses luminous bright colors.

From earliest times attention has been given to the spiritual value of color. Almost all of the Oriental religions make use of color as symbolic, some of them having extensive color charts. The Roman Catholic vestments, the colors in church windows, paintings and decorations, are selected for their spiritual meaning. Artists, interior decorators, poets and dramatists find color highly significant in its spiritual effect and use it deliberately. In general, all spiritual interpretation of colors is based on the fact that the pure, high colors have an influence for good; the murky, low colors have an influence for evil. Most of the symbolisms are based on color in nature. A fascinating contemporary application of this spiritual symbolism of color is made in the home, where colors are chosen for their spiritual effect in developing, controlling or stamping out certain traits of character, especially in children.

See Art.

Colorado (*kôl-ō-rä′dō*), one of the mountain States and the "Centennial State" of the American Union. It is quadrilateral in shape, bounded on the north by Wyoming and Nebraska, on the east by Nebraska and Kansas, on the south by Oklahoma and New Mexico, and on the west by Utah. It extends over an area of 103,948 square miles, 290 miles of which are water.

Surface. The surface of Colorado has two natural divisions, plains and mountains. In the eastern part of the State, just east of the Rocky Mountains, lies a great treeless plain, the northern part of which is situated in the upper valley of the South Platte. The southern portion of the Great Plain lies in the Arkansas valley. The lowest altitude in the State is in Prowers County about the Arkansas River which is 3,350 feet above sea level. The Great Plain slopes gently upward in a westerly direction until it is merged with the Rocky Mountains at an altitude of 7,000 feet. As the plan approaches the mountain range the slope is cut deeply by river valleys. Western Colorado is often referred to as "Out Where the West Begins." Magnificent mountain peaks soar to the heavens. Cool valleys, deep gorges and awe inspiring canyons make up a "natural art gallery," the beauty of which is incomparable. The highest peak of the mountain range rises in Lake County. Here Mount Elbert soars 14,420 feet skyward. Pike's Peak, just west of Colorado Springs, rises to an altitude of 14,110 feet. Although surpassed in height by at least twenty-five other summits, Pike's Peak is undoubtedly the most famous of Colorado's mountain wonders. On the very top of the peak is situated a meteorological station. The summit is reached by a railway running from Manitou, a distance of nine miles. Among Colorado's other lofty peaks are Mount Massive (14,404 feet); Mount Harvard (14,399 feet); Sierra Blanca (1,463 feet); La Plata (14,332 feet), and Uncompahgre (14,306 feet).

Colorado abounds in scenic beauty and sites of historic interest. Colorado Springs attracts a throng of visitors annually to its ideal location. In close proximity are Manitou, Williams Canyon, the Cave of the Winds, Pueblo Indian Museum on Phantom Cliff, and the famous Garden of the Gods, beauty which has no equal. In the southwestern part of the State is Mesa Verde National Park. Here the unique and ornamental dwellings of the Cliff Dwellers have been preserved. The most remarkable of these ruins are situated near Mancos. The grandeur of Colorado's mountain scenery is at its best in Rocky Mountain National Park. The gateway to the park is Denver. Among the most outstanding beauties of nature in this area are Estes Park, Specimen Mountain, Fall River Canyon, Idaho Springs, Iceberg Lake and Grand Lake. The splendor of Colorado's mountain scenery, the beauty of its glaciers in valley and on peak and its many sites of historic interest, have brought the State world-wide fame.

Drainage. The principal rivers of the eastern slope are the South Platte and the Arkansas, carrying the waters of the eastern part of the State to the Mississippi. The Rio Grande drains San Luis Valley. The Yampa and White Rivers are tributaries of the Green, which unites with the Grand in eastern Utah and forms the Colorado River. These waters with their numerous branches furnish an excellent supply of water for irrigation purposes.

Climate. Colorado has a delightful invigorating climate. The crisp mountain air and abundant sunshine attract thousands to this State annually. The dry but stimulating air is particularly of benefit to those seeking relief from diseases of the lungs. Nights are always cool here, even during the hot summer months.

Rainfall is most generally distributed throughout the northern and eastern sections of the State. The average rainfall is about 17.54 inches.

Minerals. Colorado is one of the richest states in the Union in mineral wealth although mining is not the State's principal industry. It ranks first among the states in the production of radium, the ore being found in The Paradox Valley, and second in tungsten. In 1931 there were 230,573 fine ounces of gold produced; 2,074,591 fine ounces of silver; 7,722,000 pounds of copper; 13,457,000 pounds of lead, and 31,975,000 pounds of gold. The principal coal fields are found in Las Animas and Huerfano Counties. In 1931 there were 6,604,063 tons of coal mined in the State. Other minerals include enormous deposits of fine building stones, iron ore, manganiferous ores, and sand and gravel products. There are 900,000 acres of oil shale land within the State's confines.

There are numerous groups of mineral springs having medicinal properties. The most noted springs are at Manitou, Canon City, Idaho Springs, Glenwood Springs, Hot Sulphur Springs, Steamboat Springs, and Pagasa Springs.

Production and Industry. The comparatively recent development of agriculture through extensive irrigation has been the wonder of western civilization. The chief agricultural areas of the State are the South Platte and Arkansas River Valleys, regions which have been extensively irrigated. The principal agricultural district of the mountain region is the San Luis Valley. There were 28,876,171 acres of farm land in the State in 1930, 8,448,684 acres of which were crop land and 19,338,377 acres of pasture. In that same year there were 3,393,619 acres of land brought under cultivation by irrigation. The principal crops, with the production in 1932, are: wheat (6,699,000 bushels); corn (13,363,000 bushels); alfalfa (1,200,000 tons); and oats (3,384,000 bushels). Colorado is the leading State in the Union in the production of sugar beets. In 1932 the production totalled 1,790,000 tons. Fruits and vegetables are extensively cultivated, chiefly potatoes, apples and cantaloupes.

Stock raising is one of the principal industries of the State. In 1932 there were 324,000 horses; 27,000 mules; 266,000 milch cows: 1,541,000 all cattle; 3,361,000 sheep; and 624,000 swine. In 1931 there were 1,736,000 sheep which yielded 13,541,000 pounds of wool.

The principal manufactures of the State are dependent upon agricultural resources and the mining industry. One of the leading industries is slaughtering and meat-packing. The making of beet sugar is most important. In 1931 there were seventeen sugar refineries in the State, the output of which totalled 370,000 tons. There are well developed foundries and machine shops in the State and large blast furnaces, steel mills, copper, lead and zinc smelters, canning factories and flour mills. According to the industrial census of 1929 there were 1,545 manufacturing establishments engaging 32,735 employés. The entire manufacturing output was valued at $304,654,661.

Colorado has an extensive forest area abounding in yellow and ridge-pole pine, spruce, hemlock, cedar, poplar, and cottonwood. The forest region is for the most part undeveloped.

Population. In 1930 the population was 1,035,791, indicating an increase of 96,162 or 10.2 per cent over that of 1920. The foreign-born white population numbered 85,406 or 8.2 per cent of the total population. The total white population was 961,117. There were 57,676 Mexicans; 11,828 Negroes; 3,775 Asiatics, and 1,395 Indians. The principal cities, with their populations in 1930, are: Denver, the capital, 287,861; Pueblo, 50,096; Colorado Springs, 33,237; Trinidad, 11,732; Fort Collins, 11,489, and Boulder, 11,223.

Education. Colorado has a well organized educational system. Public school expenditure for the school year of 1930-31 totalled $26,172,931. In that year there were 260,635 pupils enrolled in 710 public elementary, 324 senior high schools, 150 junior high schools, and 2,065 rural schools. These schools had 9,860 teachers. Two Normal schools for public school teachers are maintained, one at Greeley, the State Teachers' College of Colorado and the other at Gunnison, the Western State College. Included among the State's institutions of higher learning are Colorado College at Colorado Springs, the University of Colorado at Boulder, and the University of Denver which was founded by Territorial Charter in 1864. There is an Agricultural College situated at Fort Collins.

Government. The General Assembly, that legislative branch of the Government which holds sessions biennially, is composed of two Houses. Members of the Senate number thirty-five, elected for four years, one-half retiring every two years. The House of Representatives has sixty-five members elected for two years. The State is divided into sixty-three counties. Colorado is represented in the National Congress by two Senators and four Representatives. The capital of the State is Denver.

History. The Cliff Dwellers, ancestors of the Pueblos, were undoubtedly the first inhabitants of the mesas and canyons of the Colorado region. Ruins of their dwellings have been preserved in the canyons of the Rio Mancos, the Plata and the San Juan Rivers. Francisco Vasque Coronado is believed to have been the first white man to set foot within the present limits of the State. In 1541 he sent expeditions to West which reached the Grand Cañon of the Colorado. In 1776 Padre Francisco Escalante, a Spanish explorer, traversed the western and southern portions of the Colorado region. Although the Spaniards conducted several expeditions into Colorado in the eighteenth century, no attempt to establish a settlement was ever made. The United States obtained possession of the region in three tracts: a portion of the north and east by the Louisiana Purchase in 1803; a portion of the north and west by the Mexican cession of 1848; and the remainder by purchase from Texas in 1850. The first organized American exploration was made under government authority in 1806 by Lieutenant Zebulon N. Pike. The next exploration was undertaken in 1819 by Major Stephen S. Lang. In 1842 John C. Fremont began a series of five explorations in search of practicable rail routes. A Mormon settlement was established near the present site of Pueblo in 1846. It was not until 1858, however, that a permanent settlement was made in this region at Denver. The discovery of gold in that year brought a horde of gold seekers to Colorado. At this time trappers and scouts were about the only white inhabitants of Colorado and there were but a few forts, stockades and trading posts scattered about. The Ute Indians were dwelling in and about the region now occupied by National Parks, and on the plains roamed the

Cheyennes, the Arapahoes, the Kiowas and Comanches.

In 1861 Colorado was organized as a Territory with its present boundaries. From 1864 to 1870 there was active warfare with the Cheyenne and Arapahoe Indians. Between 1863 and 1880 the Utes ceded their domain in the mountain regions to the white man. In 1876 Colorado was admitted into the Union as the "Centennial State." Shortly after its admission to Statehood it was discovered that the lead and silver yield of the State far exceeded its gold output. Many of Colorado's towns grew up about the prosperous mines. To-day the Indians dwell upon reservations in the southern part of the State. Numerous cave-dwellings and ruins of former inhabitants have been preserved. Thriving cities have developed and Colorado, with its natural beauty, has become one of the most popular resorts in the world.

See Colorado River; Colorado Springs; Denver; Indians; American; Irrigation; Louisiana Purchase; Pike's Peak; Pueblo; Pueblos.

Colorado River, a great river flowing for 1,100 miles through the plateau region of the southwestern United States, and emptying into the Gulf of California. Its source is in southeastern Utah at the junction of the Grand and Green Rivers. It flows south through northwestern Arizona and forms the dividing line between Arizona and Nevada and California. The Colorado enters Mexico and empties into the Gulf of California from the north. The streams which form it are themselves extraordinary, but the Colorado itself has in many respects the most remarkable river basin in the world. The scenery is magnificent. The region clearly illustrates erosion, presenting vast vertical structural sections unmarred by vegetation. Its chief branches are the San Juan, Flax, Bill Williams and Rio Gila. The river and its branches flow for the greater part of its length through deep canyons. From the head of the Green to the Gulf is a distance of 2,000 miles, through beautiful snow-crowned mountains, narrow gorges and magnificent rock-walled chasms. The greatest of these, and one of the famed wonders of the world, is the Grand Cañon of Arizona, which is two hundred seventeen and one-half miles long, from 4,000 to 6,000 feet deep, and varies from one or two to fifteen miles in width at the top. The river is navigable for about 600 miles. Light steamboats may travel as far as the Black Cañon. The river has been descended the entire length by individuals, a hazardous journey rendered more difficult by hundreds of rapids, sharp curves, and shifting silt. The first white man to sail up the river was Hernando Alarcon, a commander with Coronado, who discovered the mouth of the Colorado in 1540 and ascended some distance with small boats. In 1776 Padre Escalante crossed at the place afterward known as the "Crossing of the Fathers." Various expeditions ascended or descended for greater or less distances in succeeding years, and a number of lives were lost in the attempt to navigate the river its entire length. The first known human beings to make the passage of the Grand Cañon were Major John Wesley Powell and his party who started from Green River, Wyoming, on May 24, 1869, and reached the mouth of the Virgin River on August 30.

The Colorado River in Texas, often called the Eastern Colorado to distinguish it from the Colorado which flows through the west, rises in the western part of Texas near the New Mexican boundary. It flows southeast across the state for a distance of 650 miles and empties into the Gulf of Mexico through Matagorda Bay. Its chief tributaries are the Concho, San Saba, and the Llano. Throughout most of its length it flows through a region of rich soil, and is a beautiful, clear stream, navigable as far as Austin for steamboats.

Colorado Springs, a city and the seat of El Paso County, Colorado, is situated seventy-four miles southeast of Denver. It has an altitude of 6,000 feet, and extends over a plain at the base of Pike's Peak, in the vicinity of the world famous Garden of the Gods, Cave of the Winds, Cliff Dwellings, with not far distant the Phantom Cliff Canyon, the Ute Pass Highway, and Cripple Creek. It is known the world over as a health and pleasure resort, visited by many for the celebrated mineral springs at Manitou, as well as for the scenery. The city has a park system comprising 3,000 acres. Among its beautiful buildings are the opera house, club houses, school buildings and churches. It is the seat of Colorado College, the Colorado School for the Deaf and Blind, and the national sanitarium of the Modern Woodmen of America. The chief industries are refining and reduction of ores, coal mining, and manufactures of tile and pottery. Colorado Springs was settled in 1870, but grew slowly until the discovery of gold at Cripple Creek in 1891, which nearly doubled its population. In 1930 the population was 33,237.

Colosseum (*kŏl-ŏ-sē'ŭm*), the largest amphitheatre in Rome, a spacious oval-shaped building used for gladiatorial combats, fights of wild beasts, and other spectacles. The vast arena was entirely encircled by seats. It was originally of stone with an upper part of wood which was burned in the great fire and restored in stone in 223. The Colosseum seated 87,000 persons. It is the largest, best preserved and most interesting of the Roman amphitheatres, the earliest of which were entirely of wood. It is 612 feet long, 515 feet wide, and 160 feet high. It was erected by Vespasian, completed and dedicated by his son and successor Titus in 80 A.D. At the time of dedication 5,000 wild beasts were slain and the games lasted for one hundred days. The exterior of the Colosseum is built in three rows of columns surrounded by a row of pilasters. Between the columns are graceful arches, which form open galleries running throughout the entire building. On the inside the open space in the center was covered with sand or sawdust, while the games were going on, and so was called the *arena*, from the Latin word for sand. Around the arena was a gallery where sat the emperor, senators and vestal virgins. Above were three other tiers of seats, corresponding with the three rows of columns on the outside. The Colosseum in the middle ages gave rise to the saying: "While stands the Colosseum Rome shall stand; while Rome shall stand, the world."

Colossus (*kŏ-lŏs′sŭs*) **of Rhodes,** a huge statue of Helios (the sun), the chief god of the Rhodians. It is said to have been the work of Chares of Lindus, who spent 12 years on it, finishing it in 280 B. C. It was called one of the seven wonders of the world, though not a masterpiece of sculpture. Its height was from 90 to 120 feet. It stood near the harbor; but the story that it was placed astride the entrance is erroneous. In 224 B. C. it was overthrown by an earthquake, and lay an object of wonder until 653, when it was sold to a Jew for old metal.

Colt, Samuel. See REVOLVER.

Columbia. See DISTRICT OF COLUMBIA.

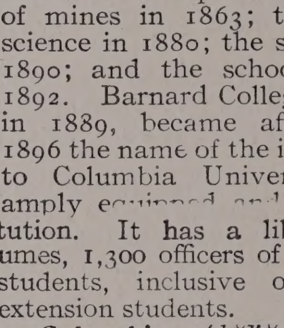
Colum′bia or **Oregon River** is 1,400 miles long. Next to the Yukon, it is the largest river on the American Pacific coast. It rises in the Rockies of British Columbia, flows through Washington, separates that state from Oregon, and empties into the Pacific. Its mouth forms an inlet from three to seven miles wide and 35 miles in length. Its main branches are Snake River and Clarke's Fork. There are many falls and rapids, so that, though it is navigable for some 660 miles, freight has to be carried by railroads past the various breaks of the river. The salmon-fisheries are noted.

Columbia, Pa., a borough in Lancaster County, on the left bank of the Susquehanna River, 80 miles by rail west of Philadelphia. A railroad-bridge across the river connects the town with Wrightsville. The town was founded in 1726 by English Quakers. Its factories include rolling-mills, flouring-mills, foundries, tanneries, silk, lace and pipe mills, wagon, brush, stove, novelty, embroidery and shirt-works. It also has manufactories of railroad-iron. It has an active civic life, good schools and a public library. Population, 11,454.

Columbia, the capital of South Carolina, is situated on the left bank of the Congaree River. The town is beautifully laid out with broad and well-shaded streets, all of which cross at right angles. Having been the capital of the state since 1790, it has many imposing public buildings, including the state-house, penitentiary, hospital for the insane, etc. Several well-known colleges and quite a number of fine cotton-mills are located in the city. When the city was evacuated by the Confederates at the approach of Gen. Sherman in the spring of 1865, large quantities of cotton piled in the streets caught or were set on fire, and all the business section and many private residences were consumed. The population in 1900 was 21,108; to-day it is 42,000

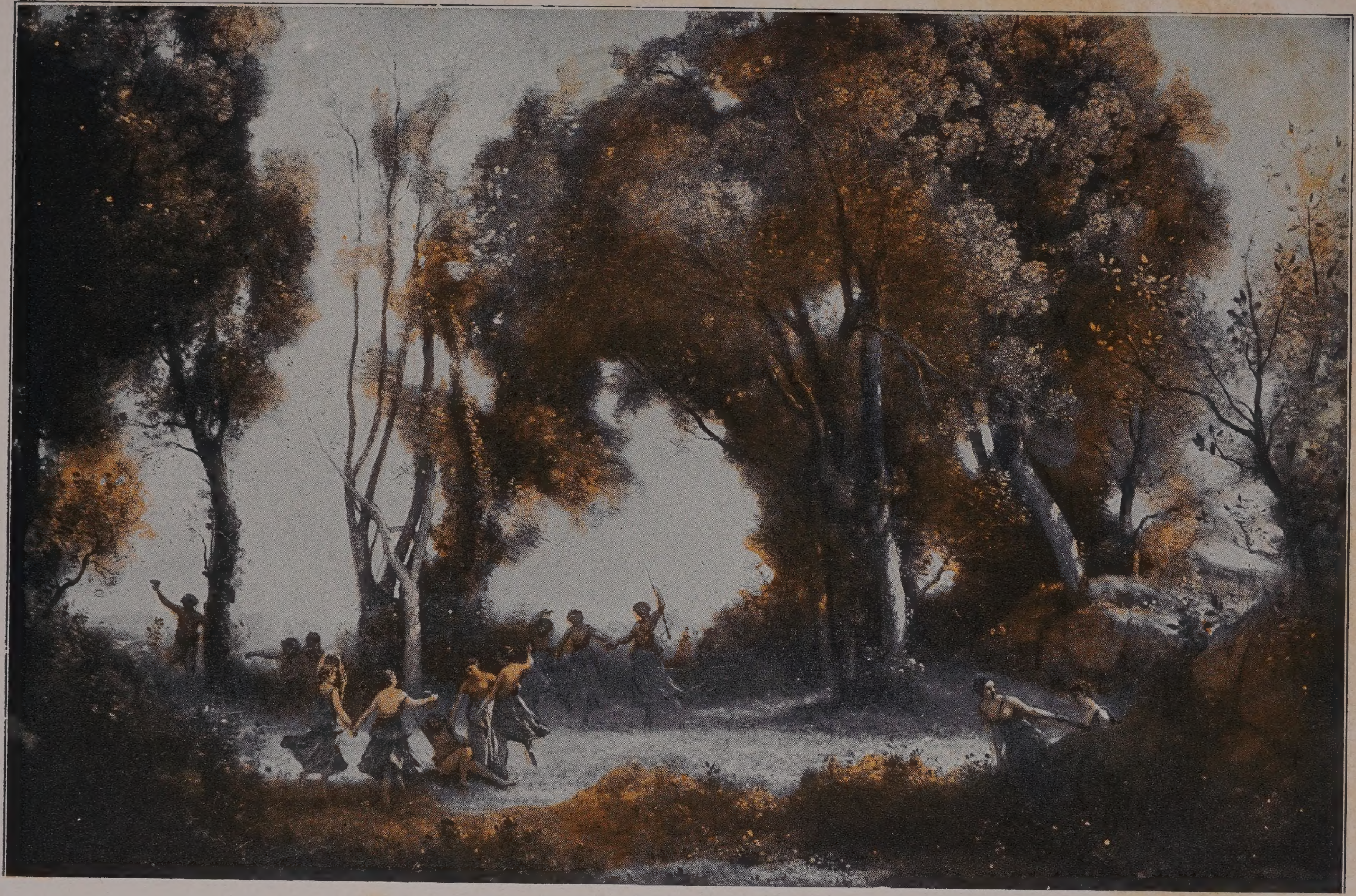
Columbia University, located in New York city, was chartered in 1754 as King's College. During the Revolutionary War the work of the college was suspended, and the building was used as a hospital. College work was resumed in 1784, and the name of the institution changed to Columbia College. Under this name the college has had a long and prosperous career. The law department was established in 1858, the medical department in 1860; the school of mines in 1863; the school of political science in 1880; the school of philosophy in 1890; and the school of pure science in 1892. Barnard College for women, founded in 1889, became affiliated in 1890. In 1896 the name of the institution was changed to Columbia University. It is now an amply equipped and richly endowed institution. It has a library of 550,000 volumes, 1,300 officers of instruction and 20,000 students, inclusive of summer-school and extension students.

Columbine (*kŏl′ŭm-bīn*), a well-known and popular wild flower, which is widely diffused, and which has been suggested as the national flower of the United States. The leaflet is three-lobed and the flower, which passes from yellow to red, has five petals with long spurs, giving it a striking resemblance to the liberty-cap.

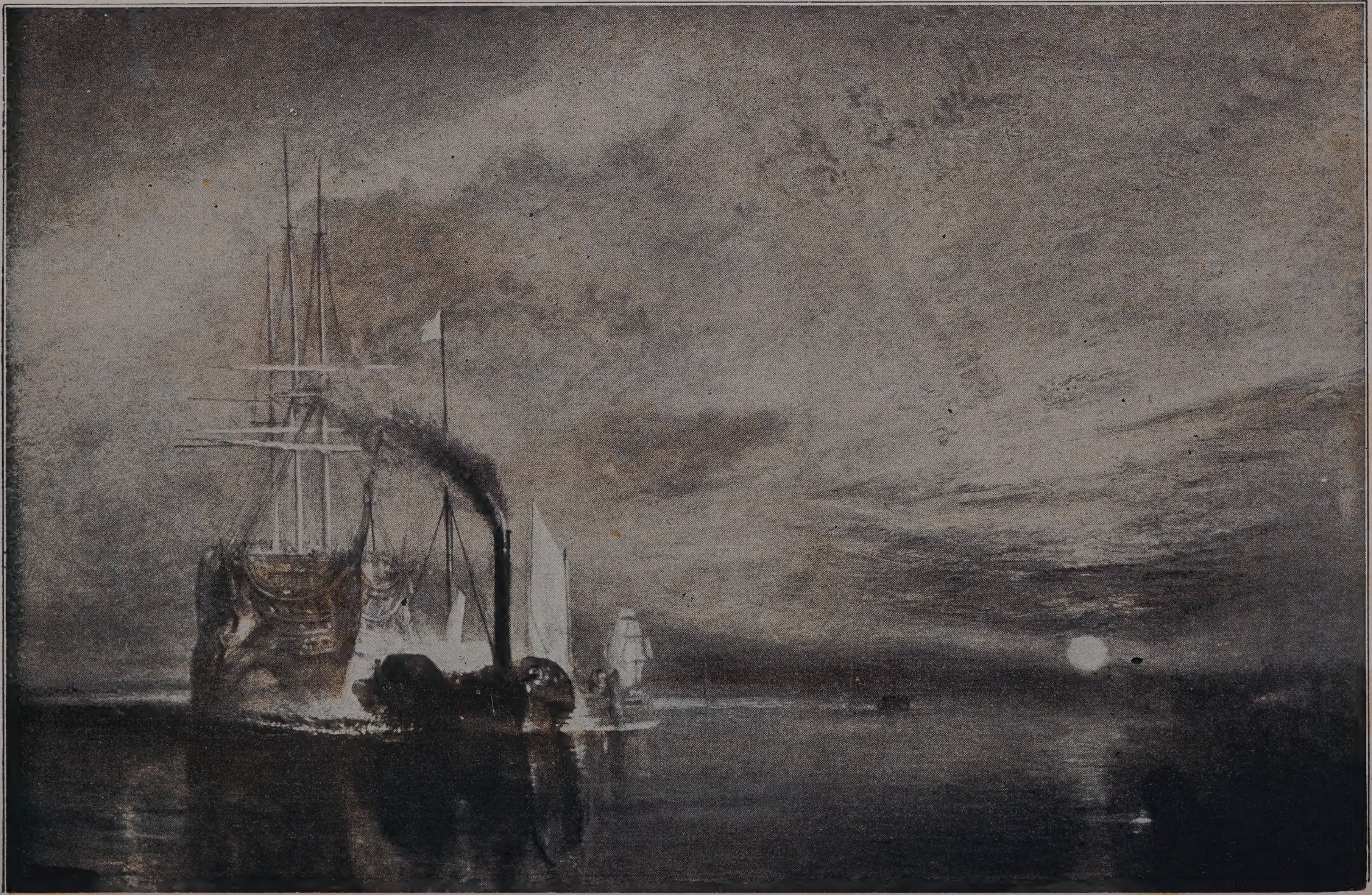


CHRISTOPHER COLUMBUS

Columbus, Christopher. In 1470 there arrived on the coast of Portugal, on a plank that was part of the wreckage of a privateer sunk in a sea-fight, an adventurous mariner. Born in Genoa, Italy, perhaps in 1436, perhaps in 1446, he was of the stature and coloring of Norse pirates. His eyes were as pale a blue as sea-ice, his red and white skin was bronzed by 20 years' exposure to wind and sun; his auburn hair, already pointed with silver, shone like a nimbus above a handsome, smooth-shaven, aquiline face. Besides being a skilled navigator, he was a man of learning, temperate habits and speech and as strict piety as if he were of some religious order. These qualities must have recommended him in Lisbon, for the Portuguese were among the most ardent Christians and the most daring voyagers in the world. Grad



Dance of the Nymphs—*Corot*



The Fighting Temeraire — *Turner*

ually the facts came out that Columbus, Colombo or Colon (for he used the Latin, Portuguese and Spanish forms of his name indifferently) had learned geography, mathematics and nautical astronomy, and had coasted the Mediterranean and voyaged to the Guinea coast. He had read Marco Polo and Sir John Mandeville, and knew of the strange, disquieting adventures of Portuguese voyagers who had been blown far to the westward. He boldly held the not original opinion that the earth is a sphere.

Although unknown and penniless, this man was so remarkable that within a year he had married the daughter of Palestrello, an ex-governor of the Madeira Islands and a learned geographer. He thus had access to the dead man's maps, charts and calculations that confirmed his opinion that the Indies and the land of Kubla Khan could be reached by sailing westward. He presented a plan for an expedition, first (about 1475) to Genoa, then to John II of Portugal, to Henry VII of England, to two Spanish dukes and finally to Ferdinand and Isabella of Castile.

Twelve years he spent, a beggar at indifferent courts, dismissed as impracticable by the wise, ridiculed by the foolish, betrayed by cupidity, deluded by false promises. His wife died, his property was exhausted, he had been made the buffet of capricious fortune. But he was not dismayed. When learning, piety, self-control and a single-hearted purpose go hand in hand, they may defy all the fates to baffle them. At 55 [?45?] years of age we find him (1492) leading his motherless son, Diego, through the lovely landscape of Andalusia, begging bread and shelter of the monks of La Rabida, a monastery that overlooks the harbor of Palos. Undiscouraged, he poured the tale of his incredible ambition into the ears of the simple brothers, only to find among them a geographer who could understand his plans and an ex-confessor to Queen Isabella who could recommend him to royalty. On the 3d of August, 1492, the monks of La Rabida bade him God-speed out of the harbor of Palos, on the most momentous voyage in history.

How perilous that voyage was you must read a long biography to realize. It lasted ten weeks. The crews of 120 men were mostly made up of criminals and vagabonds, who had choice of this dangerous adventure or of imprisonment for their misdeeds—as treacherous a lot of cut-throats as ever commander shipped.

The Island of Guanahani was sighted on the 12th of October, 1492, and the banner of Spain unfurled above the soil of the New World. The details of this and of his three subsequent voyages are given in every school-history. The great discoverer had the misfortune—for Spain—to sail too far south. Had he cleared the Bahamas, he must have reached the Carolina coast and discovered the continent of North America. But he struck the wilderness of islands, large and small, that guard the Gulf and the Caribbean Sea, and thus won tropical America for Spain and Portugal, leaving the more valuable northern continent for England and France to colonize and fight over. He thought the earth-sphere much smaller than it is and Asia much larger, and mistook the archipelago of the West Indies for islands fringing India, China and Japan. So he continued to explore these, seeking always the continent beyond. On his fourth and last voyage he skirted South America, found the Orinoco River, and reached Yucatan. The sweep of the Gulf Stream made him look for a passage westward about where we are digging the Panama Canal to-day. On his first voyage he built a fort on San Domingo, now Haiti, out of the wreckage of the Santa Maria, and planted a colony. Then he returned to Spain with gold, strange plants and animals and six natives for baptism. After his second voyage, in 1493, misfortune, misery and insults marked the remaining ten years of life, lightened by brief periods of wealth, honor and royal favor. In the failure of his colonies too little allowance was made in his own time for the evils of a tropical climate, savage natives and uncultivated land. Too little is made by his biographers of the character of Spanish colonists. The adventurers who went with Columbus were inspired, not by desire for a home in the New World, but by greed for gain and by religious bigotry that had its logical result in exploitation and cruelty. His long absences from Spain gave ambitious and unscrupulous men at court ample time to plot, so that adequate support and authority were withheld from him. From his third voyage (1498) he was sent home (1500) in irons and, as he feared, to disgrace and death. Tardy reparation made and his enemies punished, he had the magnanimity to set out on a fourth voyage in May, 1502, for their majesties of Spain. In May, 1506, he died at Valladolid, Spain, aged 60 or 70. In 1796 his bones were removed from San Domingo to the cathedral at Havana, Cuba. The title Duke of Veragua was conferred on his son Diego, and continues to-day in the descendants of his great-granddaughter.

Columbus' task was to conceive a benificent idea and to put it to the proof in the most obvious way. For this his knowledge was as complete as possible, his plan definite, his purpose undefiled by self-interest, his resourcefulness and persistence unbounded, his courage sublime. He found a path across the unknown seas, and charted it so others could safely follow. He had sown the seed, leaving to others the harvest. Even the continent he had discovered was given the name of a later, lesser man. But for that he probably would have cared little. His personal name Christopher, he shrouded in a mystical, pietistic signature which symbolized the fact that he considered himself but a servant of Christ, Mary and Joseph. Above his title which made the descendants of a Genoese woolcomber grandees of Spain, he held his rank of admiral. He was the greatest mariner the world had seen, or was to see, undespairing, undismayed. By his will he directed that the head of his house, in every generation should describe himself as Duke of Veragua, *The Admiral*. The best known and most accessible life of Columbus is probably the one by Washington Irving. It needs to be supplemented by the writings of Adams, Fiske, Harrisse, Markham, Prescott, Thacher or Winsor.

Colum'bus, Georgia, a railroad center at the head of navigation on Chattahoochee River. It has wonderful waterpower, aggregating 136,000 horsepower at and above the city, 27,000 of which is already developed and in use. It is a large manufacturing center, having 16 cotton-factories, 6 large fertilizer factories, two large iron-mills, two flour-mills, clothing-factories, the largest show-case factory south of the Potomac and a variety of industrial establishments, including cotton compresses, woolen mills and wood-working plants. There are also many large factories just beyond the city limits. It has an excellent school-system, providing for all children from kindergarten to college. The latest addition to its school-system is the secondary industrial school which is an academic trade-school of high-school rank. According to the census of 1900, the population was 17,614. It has had a steady growth of recent years, and its population by latest census is placed at 35,000

Columbus, Ind., a city and county-seat of Bartholomew County, situated on a branch of White River. It has flour and starch-mills, and manufactures agricultural implements, furniture and cerealine. It has the service of the Big Four and Pittsburg, Cincinnati, Chicago & St. Louis railroads. Population, 8,813.

Columbus, the capital of Ohio, is situated on the Scioto River, a little south of the center of the state. It is a city of broad streets and large parks. The fine capitol and the United States and board-of-trade buildings are among its main structures. It contains an insane hospital, state penitentiary and asylums for the blind and deaf and dumb. There are many public-school buildings, 8 of them high-schools, and they have more than 60,000 pupils. Among the higher institutions are Capital City University, Ohio State University and St. Mary's Academy. Besides, there are three medical colleges, a dental college and five public hospitals. There are several parks and 50 or more churches. Natural gas is used for domestic purposes, and there is an unlimited supply of bituminous coal near the city. Columbus is an important manufacturing city, possessing steel-plants, blast-furnaces and malleable-iron works, and making cash-registers, agricultural implements, automobiles, all varieties of vehicles and shoes, gloves and clothing. Its public buildings in number and cost are not excelled by any city of the country, except Washington. Columbus was laid out in 1812 and incorporated in 1834. It has been the state capital since 1816. Eighteen railroads and its nearness to the Ohio coal-and iron-fields have done much to increase the growth of the place. Population, 300,000.

Columel'la (in plants), an axis of sterile tissue which passes through the center of the spore-case of mosses. See Musci.

Coman'ches (*kŏ-măn'chĕz*), a tribe of Indians of the Shoshone family. They do not live in villages, but, carrying their skin-lodges with them, roam over the country. When first found by the French in 1719, they hunted from the head-waters of the Brazos and Colorado to those of the Arkansas and Missouri. They are great hunters, riders and fighters, and are divided into eight bands. They had long and bloody wars with the Spaniards, were at one time on a reservation in Texas, and later some of them were in the Indian Territory. They have medicine-men, and worship as their god Niatpol (meaning "my father"). Years ago, they numbered 10,000 or 12,000, filling up their ranks with Mexican captives. They now number some 1,500, and are chiefly settled now in Oklahoma.

Com'edy. See Drama.

Com'ets, the name given to those large and more or less bright bodies which now and then enter the solar system, sweep around the sun, and again return to more distant regions of space where they become invisible as before. In general comets are composed of three parts. First, there is a luminous cloud, the *coma*, from which these bodies take their name. In its center is generally found a brighter *nucleus*, the part which the astronomer observes when he determines the orbit of the comet. Thirdly, there is the *tail*, which is a great streamer of light, following the comet as it approaches the sun and preceding the comet as it leaves the sun. Considered with respect to their brightness, comets may be divided into two classes: *telescopic* comets and *naked-eye* comets. By far the greater number belong to the first class and can be seen only by the aid of a telescope. Considered with reference to their orbits, comets may be divided into three classes: (1) those whose orbits are elliptical; (2) those having parabolic orbits; and (3) those having hyperbolic orbits.

Nearly all comets appear to move along a parabola, having the sun at the focus; some 20 per cent., however, of those studied move in elliptical paths. Since a parabola is a curve which has two branches extending off to infinity, we do not expect ever to see again a comet which has a parabolic orbit. But an ellipse is a closed curve, and accordingly some of those comets having elliptical orbits have been observed many times.

NATURE OF COMETS

Concerning the composition or structure of comets very little is known, and that little has been learned almost entirely from the spectroscope. This instrument shows that a very small portion of the comet's light is reflected sunlight. The comet shines by its own light, giving a spectrum which is described as follows by Professor Young of Princeton:

"The spectrum of most comets consists of a more or less faint continuous spectrum (which may be due to reflected sunlight, though it usually is too faint to show the Fraunhofer lines) overlaid by three bright bands,—one in the yellow, one in the green and the third in the blue. A fourth band is sometimes visible in the violet. The green band, which is much the brightest of the three, is in some cases crossed by a number of fine, bright lines, and there are traces of similar lines in the yellow and blue bands. This spectrum is absolutely identical with that given by the blue blaze of an ordinary gas or candle flame; or, better, by the blue flame of a Bunsen burner consuming ordinary illuminating gas. Almost beyond question it indicates the presence in the comet of some gaseous hydrocarbon, which in some way is made to shine; either by a general heating of the whole body to the point of luminosity (which is hardly probable), or by electric discharges within it, or by local heatings due to the action of sunlight; or none of these surmises may be correct, and we may have to seek some other explanation not yet suggested.

It therefore, on the whole, appears highly probable that comets are bodies made up of small discrete particles.

One great mystery in connection with these bodies is the fact that the tail is repelled by the sun But recently the Swedish physicist, Arrhenius, has given an explanation of this fact, which is quite plausible. He bases his explanation upon the fact, discovered by Maxwell, that a beam of light exerts a pressure in the direction in which the light is traveling and that the amount of this pressure is numerically equal to the amount of energy, in unit volume, of the beam of light. If, now, the particles of which the comet is composed are very small, they will present a surface which is very large compared with their mass. Since this pressure increases very rapidly as the comet approaches the sun, it is an easy matter to compute, for particles of any given size, just how near the sun they must go in order that this repulsive pressure due to sunlight may equal the gravitational attraction of the sun for the particle. If the comet should come nearer the sun than this limiting distance, repulsion will ensue. Or at any given distance we can easily compute the size which the particles must not exceed in order to be repelled by the sunlight. This explanation is quite is accordance with the results obtained by means of the spectroscope.

REMARKABLE COMETS

In recent times the most brilliant comets are those of 1858 and 1882. The former is known from its discoverer as Donati's. To the astronomer no comet has more interest, perhaps, than that of Halley (1682), whose return to the solar system in 1759 was predicted by its discoverer. The comet actually returned, as predicted, and in 1835 returned for a second time. Its next return occurred in 1910. Encke's comet is also one of great interest, returning every three and one-half years. See Miss Clerke's *History of Astronomy during the 19th Century*, Chaps. 5, 10 and 11.

Commerce. The idea of commerce is a part of the idea of property, and property implies that a thing has value to oneself and also to others. In commerce there is an exchange of property, in which each party gains what he desires. But commerce is no longer the mere *barter* of savages. It is a vast system in which all the world shares. It helps to make prices and wages more equal. It also keeps them more fixed, for, if one group will not pay a fair price, the goods may be sent elsewhere. It gives a very wide market, so that a country may now produce more butter or meat than it needs, and yet sell all of it by sending the surplus abroad. It brings people all over the world into greater sympathy with each other, and gives them more knowledge of each other. Thus a failure in the cotton-crop of the southern states has been the cause of almost a famine in Lancaster, England, where much of the cotton is made into cloth. Commerce is favored by a large coast-line and good ports; for it is cheaper to carry goods by water than by land. It depends partly upon soil and climate and the presence of iron and coal in a country; partly, too, upon the cheapness of labor; but more largely upon freedom and security, industry and ease of communication.

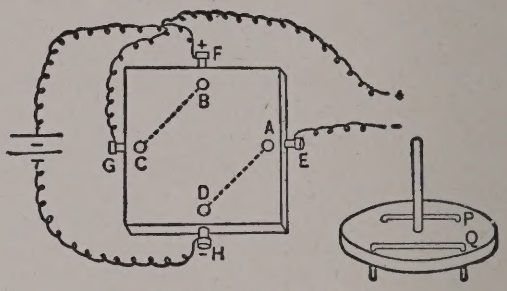
So far as is known, the Arabs were the first great overland traders. The Phoenicians, however, a nation of traders whose home was on the strip of coast that lies about Tyre and Sidon, were the first merchants to plan and execute great voyages by sea for the sake of trade. Their ships roved even to the Atlantic and the distant shores of Britain. The Greeks also were great traders; and Carthage, a Phœnician colony, became so powerful and wealthy through her commerce that it required all the might of Rome to humble her in the dust. In the middle ages the great trade between Asia and western Europe lay chiefly in the hands of the merchant republics of Venice and Genoa. But so soon as the route round the Cape of Good Hope to India was found and the new continent of America also came to attract the eye of the European trader, commerce centered in the nations of the Atlantic rather than of the Mediterranean. At first Spain and Portugal, and afterwards England and Holland became the great world-traders. In the latter part of the long strife of England and France for colonial empire the United States, having won their independence, became the great neutral carriers of merchandise.

The extent to which commerce grew in the nineteenth century is almost beyond belief. It was favored greatly by the invention of the telegraph, the success of ocean-cables (q.v.) the building of railroads and the invention of steamships. It was only in 1819 that the first steam-vessel crossed the Atlantic Ocean. In England in 1800 the imports were valued at under $29,000,000; in 1900 at over $523,000,000; while the exports in 1800 were valued at under $35,000,000; and in 1900 at over $354,000,000. Or take the commerce of the United States in the second half of the nineteenth century. Whereas in 1850 the exports and imports together amounted to $318,000,000; in 1900 they amounted to no less than $2,244,000,000 in estimated values, while in 1907 they amounted to $3,315,272,503.

Commons, House of (English). See PARLIAMENT.

Com'mune of Paris (*kŏm'mūn*). Commune is the unit or lowest political division of France, corresponding to the American township. The rising of the Commune of Paris, in 1871, should not be confounded with communism, with which it had nothing to do. It was a revolutionary attempt to establish self-government for Paris. The theory of the rising was that every commune should have self-government and that the state or central government should be merely a federation of communes. The movement was caused by discontent in Paris, where the people found themselves in possession of arms after the siege by the Germans. The rising occurred on March 18, 1871, and was put down only after 10 weeks' long and bloody fighting between the forces of the commune and a large army of the central government. Sixty-five thousand communists fell during the last ten days in May.

Com'mutator. In most kinds of electrical work it is necessary at times to change the direction of the current in some part of the circuit. The commutator is an instrument for producing this change. The device represented in the accompanying figure is typical of all commutators. The block A, B, C, D is made of wood, and has four holes bored about half-way through it. These holes, placed one at each corner of a square, act as cups to hold mercury Into the sides of the block are inserted four wires, E, F, G, H. Each of these wires connects with the mercury in the cup nearest it. The poles of the battery are joined to two diametrically opposite cups, say B and D; the wires from the rest of the circuit, say from a galvanometer, are joined to the remaining two cups, A and C. For closing the circuit two short, thick, copper conductors P and Q, are mounted on a movable block, as shown in the figure. These connectors, P and Q, may be placed in the mercury cups in such a way as to connect B with A, and hence C with D; or they may be placed so as to connect B with C, and hence A with D. In the one case the current flows from G to E through the galvanometer; in the other case from E to G. To change the direction of the current in the galvanometer circuit, we have, therefore, only to lift the top block and rotate it through 90° in either direction. Such an instrument is called a commutator.



A TYPICAL COMMUTATOR

In many kinds of electrical machinery the commutator is made to work automatically. Thus, in the case of the dynamo, the currents which are generated in the coils of the armature are alternating, but a commutator is in many instances placed on the shaft of the armature, which automatically reverses the connections of the armature-coil and the external circuit, so that the current in the external circuit always flows in one direction. Such a dynamo is called a direct-current generator. The dynamo which is not provided with a commutator is called an alternate-curr generator.

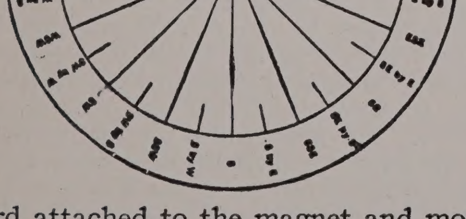
Como (*kō'mō*), **Lake,** is situated in northern Italy, at the foot of the Alps. It is 30 miles long, and its greatest width is two and one half miles. The fine climate and the beauty of the scenery of its shores have made it the most popular resort of any lake in Italy and its shores are lined with handsome villas.

Comoro (*kŏm'ō'rō*) **Islands** or **Comores,** lie in the Mozambique Channel. They have been French since 1886, and are administered by the governor of Réunion Island, who appoints a resident for Great Comoro and another for Moheli and Anjuan, which with a number of islets make up the group. The total area is about 620 square miles, with a population of 47,000, nearly all Moslem. Each island has its own budget, and all are self-supporting, sugar and vanilla being successfully grown and coffee and cloves under development. An important coaling station is situated here.

Comox. The northern part of Vancouver Island (British Columbia). A part of the opposite mainland is called Comox district. The two contain 4,000,000 acres. The district is very rich in minerals and timber. Considerable fertile land is found between Comox Bay and Campbell River. The Esquimault and Nanaimo Railway will go through the district. Along the deeply indented coast-line the fishing industry is being developed on a large scale. The whole district is very rich in fertile belts, minerals and timber.

Compass (*kŭm'pas*), **Magnetic,** an instrument for indicating the direction of the magnetic meridian. The importance of this determination lies in the fact that, if we know any one fixed direction, such as this magnetic meridian, it is easy to locate any other direction by the use of a graduated circle. In this way the direction of a line-fence or the course of a vessel may be easily described.

The three parts of a mariner's compass are (1) a freely suspended steel magnet; (2) a card attached to the magnet and moving freely with it; and (3) a compass-box, in which the needle and card are so mounted as always to remain level, however the box may be tilted.



The free suspension of the needle is generally obtained by attaching to it a cap of agate or ruby, which rests on a hard, sharp point.

Practically all the compasses now used on ocean-going vessels are of the type devised and patented by Lord Kelvin in 1876. The magnet is built up of eight or ten small magnets placed some distance apart but parallel to each other. Since the greater part of the mass is thus placed at considerable distance from the axis of rotation, the Kelvin needle is very steady.

For many centuries—at least since the time of Chaucer (1391)—the compass-card has been divided into 32 equal angles called points. Each point is evidently equal to 11¼°. The names of these points are indicated in the accompanying figure.

In the surveyor's compass the needle swings freely over a circle divided into degrees and provided with a pair of sights. When these sights are so placed that the line joining them lies in any desired direction, the end of the compass-needle indicates at once the angle which this desired direction makes with the magnetic meridian.

The origin of the compass is lost in obscurity. About 1200 A. D. it was commonly used on the Syrian coast, and it is said that Marco Polo in 1260 brought the knowledge of this Chinese invention to Europe. Gioja of Amalfi, Italy, improved the instrument about 1320. Its variation was known long before Columbus noticed it.

Compass-Plants. The ordinary position of a leaf is approximately horizontal. In regions of intense sunlight and dry air, however, certain plants have learned to turn their leaves edgewise. This is called the profile position, and by means of it one edge of the leaf is turned upward toward the most intense light, and thus the leaf avoids too great drying out. The flat surfaces of the leaves thus face the morning and evening rays of light, which are rays of less intensity than those of midday. As a consequence, the leaves point either north or south, and hence such plants were called compass-plants. The rosin-weeds (*Silphium*) of the prairies and the common prickly lettuce (*Lactuca Scariola*) of waste grounds everywhere are among the most notable of the compass-plants. The profile habit is common in the dry regions of Australia, giving to their vegetation a very peculiar appearance.

Compos'itæ, the greatest family among seed-plants in point of numbers and in rank. They form one tenth to one seventh of the seed-plant vegetation of almost all regions. Among them are the asters, goldenrods, rosin-weeds, sunflowers, chrysanthemums thistles, daisies, ragweeds, sage-brush, lettuce, dandelion and others. They are characterized by the fact that their numerous small flowers are closely packed together in heads which resemble flowers. The sunflower, for example, is a head of very many small flowers, the head being surrounded by a set of bracts known as the involucre, which resembles a calyx. The outermost flowers develop showy petals, and thus resemble the petals of an ordinary flower. Another peculiarity of the family is the transformation of the calyx into the so-called pappus, which commonly, as in the thistle and dandelion, takes the form of a tuft of fine hairs for transporting the seed-like fruit (*akene*).

Composition in Fine Art. In the essay upon the fine arts it is shown that the essential quality in a work of art is the power of bringing about a certain repose in the mind of the person who is contemplating the work. Hugo Münsterberg observes this in defining the mission of art instruction: "To bring into every life the ideal repose, the repose in the ideal; to bring us that rest which is not fatigue from work, nor the rush of amusement; no, rather that rest which is complete satisfaction beyond the struggles of the day, complete harmonization of all our energies, complete fulfillment of our real personality."

A work of art, in order to give this complete repose, must have but one theme; it must be free within itself from conflicting attractions or suggestions; it must, in other words, have *unity*. Whether it be a sonnet, sonata, picture, vase or cathedral, it must give one impression. That impression may be simple, as is that given by the architecture of the California missions: it may be complex, as is that of St. Mark's cathedral in Venice; but it must be *one*. It may be grand, as in the sculptures of Michelangelo, or it may be delicate, as in the carvings of the Japanese, but it must be an *unconfused* impression. It may be brought about by combining many similar forms, colors, lines or suggestions until they add power to one another, as in some of the poems of Joaquin Miller — giving that quality which we call harmony; it may be brought about by leading the attention to an unlikeness in certain related things, as in Keats's sonnet *The Grasshopper and the Cricket*, producing a contrast; but in either case a single impression must result.

Now, it will be clear that nature does not always exist in perfect harmonies or perfect contrasts. Nature indeed has other business in hand than the forming of perfect pictures. If he would produce pictorial beauty, the artist must make many a change in the "landscape with figures amid which we dwell." Let us review some of the demands upon him in this respect.

When, in looking over the fields, we send our glance from the trees to the hills beyond them; when we remove our eyes from a person to whom we are speaking, to the walls just behind him; when, in fact, we leave off looking at any one thing and look at something either farther away or nearer than that at which we were looking before, our eyes change their focus for the occasion in somewhat the way in which the focus of a camera is changed to suit varying distances. The eye, however, is by far the more subtle instrument, and is sensitive to variations of distance which would make no apparent difference to the camera. It may therefore be said that each thing we see in nature is, when it is being seen, the center of a little picture all its own and that it is the sum of a number of these little pictures which gives us our impression of "all outdoors." Now, if the artist were to try to paint in one picture the hills as he sees them when looking directly at them, the trees as he sees them when looking directly at them, the clouds as he sees them when looking directly at them, he would have a picture with as many separate interests as it contained objects—a picture which could never have unity or give repose of any sort. So the artist must select some one thing for the main theme of his picture, and to this he must subordinate all other things which may occur in it.

A study of great paintings and illustrations will show the various ways in which artists accomplish this suppression of the secondary things and emphasis of the important ones. It will show that a figure may be made prominent by the position it occupies on the canvas, by its relations to other figures, by its having a space of comparative quiet around it (notice the effect of the halos around the heads in the old-master paintings of the saints), by the focusing of many important lines upon it or the introduction of a contrast near it, by its being more minutely drawn and finished than the rest of the picture, and by the suppression of other figures or groups of figures through partially hiding them from view, turning them away from the spectator, causing them to look or point toward the principal figure or throwing them into a subdued tone.

In nature it is sufficient if the form of a tree be beautiful against the sky; in a picture the visible shapes of sky seen through the tree must be equally beautiful. The picture, since it is all to be seen at once, must be a beautiful pattern in which every shape involved is fine, the background spots not in any sense being left-overs from the shaping of the motif-parts; rather, being conceived in the same æsthetic spirit which characterizes those parts. The contours which distinguish tone from tone may not fall merely anywhere, but only in such ways that tone and tone and interest and interest shall be fairly held at pleasing intervals. Consistency of character, which has been called harmony, consistency of attractions, which has been called balance, and consistency of movement, which has been called rhythm shall keep all elements of the work together in an integral whole. Here again the artist in forming his work must exercise his æsthetic judgment, varying from nature's appearances, if need be, to bring finer proportion into his work, to give it more perfect unity.

The beauty of a picture or a piece of music does not lie in a pleasing of the sense alone. Perhaps it is impossible for the sense to be engaged at all without the mind receiving some deeper message through it. It is this fact which causes us to observe in another place that art is a sort of language. But the message which that language has to deliver is not an intellectual one. It is not primarily for the rehearsing of facts that art exists. The message which a picture has to give, like the message which music has to give, comes to us in the form of an experience, a mood which the work awakens within us—not a story which the thing can tell us. A Bokhara rug may be of "sleepy coloring" and give us the repose of twilight as we contemplate it; a clear melody may give us the same feelings as a view from a mountain-top; a dash of thrilling color may be to us like a battle-hymn. Such are the messages we may receive from pictures and music if we but will, instead of the story that "here is a man and he is doing so and so." These are the feelings which come to us straight from the heart of the artist himself, even though he be centuries in his grave; the tree, the figure and the incident which the work involves are merely the words by which the message is conveyed.

For some reason music in a minor key is apt to make us sigh. For some like reason certain kinds of lines or movements in a picture give us certain emotions. Perhaps it is because these lines or movements recall associations which stamped themselves upon the impressionable childhood of the race. The ridges of the sea which we call waves and the grander ridges of the continents which we call mountains have had their common origin in the war or play of the elements—in activity rather than in quiet. The risings and fallings of the waves and the mountain-ranges, the high, straight stems of those still forests amid which generations of our primitive ancestors spent the long days and the mysterious nights, the long flat reaches of the sea when it is calm and of the desert and of the clouds in a quiet sky—all these things have been seen and watched for ages; nor is it to be wondered that the lines which we see in them, the movements which we feel in them, have come to call up the same feelings which these things themselves called up.

Let us look at Corot's landscape *Morning*. It has come to be called *The Dance of the Nymphs*. Is this because there is a group of tiny figures at the bottom—who in truth are scarcely dancing and who may hardly be called nymphs? Or is it because of the witchery of that great movement which takes us from the bottom up into the picture, across the top and down the other side, lastly circling round and round the bit of sky in the center, leading us, before we know it, in an airy dance through the tree-tops? The little figures give the key-note—they form a statement of the theme, Morning, Happiness, Dancing, but even if they were suddenly to whisk themselves out and disappear on the other side of the tangled shrubbery, the movement of the picture would still go on, and it would still be a dance of the nymphs.

For a contrasting mood see Turner's great picture, *The Fighting Temeraire*. What is there about this picture to show us that this ship is the old hero of England's battles that she is,—or to tell us that she is being towed away for breaking up? And yet Ruskin says that, of all pictures not visibly involving human pain, this is the saddest. What has the artist done to make us feel the solemnity of this occasion? We see a sheet of still water under a great, bending, sunset sky. On the other side a tall ship is coming up, towed by a black tugboat. Long ripples are thrown to left and right, and thin smoke pours back from the funnel of the tug. Shadows are gathering from all sides, and there are the buildings of a great city beyond in the gloom. Study the use of lines. Are they like those merry ones that circle round the canvas of Corot's *Morning*? Or are they the lines which we see in the solemn groves of pine or cypress, in the desert and in the great cathedrals? Are they not like figures in a funeral march? Has the artist accepted nature only as he found her?

We have shown the three principal considerations which compel an artist always to turn away more or less from the copying of nature. Of all these, doubtless the last one which we have touched is the deepest, the one determining the trend of the whole work,—the consideration of *expression*. Intimately related to that one is the second—the consideration of *absolute beauty*; and the third is that one which deals with the *translation of the three-dimensional aspect of nature into the two-dimensional limits of a picture*. We have spoken of the lines and colors and objects of nature as the artist's alphabet and vocabulary. Were he to devote his time merely to copying the things which nature sets before him, he would be practicing only the handwriting of his art. The considerations which we have enumerated above give him a grammar and a composition—the power to express himself—the power of being understood.

The process of selecting, arranging, subduing and accenting the forms, tones, colors, movements and interests of his work, so that they will produce the mood or set forth the idea which he is endeavoring to present, so that they will give unity and through it the "perfect repose"—this the artist calls composition.

George William Eggers.

Compressed Air. The first scientific knowledge of the power of air was gained in the sixteenth century by Galileo. Air under pressure increases in density and heat, and exerts an increased power in every direction. Hence compressed air is applied in locomotives; and its power is employed in many machine-plants, such as those of mines and water-works. An air-compressor or air-pump is a cylinder fitted with a piston and rod, and with valves at which the free air may enter and with others at which the compressed air may be applied, together with the needful connections of this apparatus with the driving power. In most compressed air "plants," the pressure which is employed is about 80 pounds to the square inch. Air may be liquified at a temperature of 312° below zero. This temperature may be got under a pressure of 1,200 pounds or upwards to the square inch; but the process is thus far not profitable from a commercial standpoint, although there are several ways in which liquid air may be applied.

Compromise of 1850, a measure designed by Henry Clay and, largely through his efforts, adopted by both houses of Congress in August, 1850. Its chief purpose was to satisfy the conflicting demands of the north and the south in the matter of slave and free territory. The leaders for the south were attempting to have the recently acquired Mexican domain organized into states all of which should permit slavery (The Clayton Compromise); were trying to have the Missouri Compromise line extended through to the Pacific; were backing Texas in her demand either for a money indemnity or the Rio Grande as a western boundary; were demanding an effective fugitive-slave law; were demanding that no free state should be admitted unless paired with a slave state. The leaders for the north were backing California's demand to be admitted as a free state; were attempting to have slavery abolished in the District of Columbia; were seeking to prohibit interstate commerce in slaves; were justifying the personal-liberty laws which made just about useless the fugitive-slave law; were resisting the demands of Texas. There was a deadlock, and to many civil war seemed certain. Then Clay introduced his compromise. It was debated for nearly five months, but was passed about as Clay had designed it. It provided that California be admitted with her free constitution; there should be no slavery prohibition in the organization of the territorial governments founded in the Mexican domain (including territories of New Mexico and Utah); Texas should receive her indemnity; slaves might be held in the District of Columbia; there should be no slave-trading in the District of Columbia; the fugitive slave law be enforced; inter-state slave trade should not be interfered with. Passed to avert a clash at arms, the measure was one of the shortest lived in history. The fugitive slave law rapidly made the whole north abolitionist, hastening the passage of the Kansas-Nebraska bill, which made the whole compromise a dead letter.

Comstock, Mrs. Anna Botsford, Professor of Nature Study, Cornell University; in which study she has written a number of books. She was born at Otto, N. Y., Sept. 1, 1854.

Com′stock Lode, a ledge of silver to which Virginia City, Nev., largely owes its growth. Discovered in 1859, the lode has yielded at times over $10,000,000 yearly. The shaft is 2,300 feet deep; but work is now only done on the upper levels, the workmen having been driven from the depths by the great heat (120° F.) and by the suffocating gas produced by the action of the air on the sulphurous rock cut at different levels.

Comte (*kônt*), **Auguste,** was born Jan. 19, 1798, at Montpellier, France. In philosophy he was for six years a pupil of St. Simon. In 1826 he began lectures which grew into his treatise on positive philosophy. He is the founder of that school of philosophy called positivism. Comte died at Paris on Sept. 5, 1857.

Comus, a masque by Milton, contains perhaps the most beautiful and tender appreciation of the beauty of purity and holiness which is to be found in all poetry. Its moral is:

"Mortals, that would follow me,
Love virtue; she alone is free;
She can teach ye how to climb
Higher than the sphery chime;
Or, if virtue feeble were,
Heaven itself would stoop to her."

Comus, the god of revel, is not mentioned in the classical myths; but in the 3rd century A. D. he is referred to in connection with art. In Milton's poem a maiden, parted from her brothers in the wood where Comus holds his revels, is saved from the swinish cup which is offered to her by her own constancy and innocence. Among the greatest lines are these:

"So dear to Heaven is saintly chastity,
That, when a soul is found sincerely so

A thousand liveried angels lackey her,
Driving far off each thing of sin and guilt;
And, in clear dream and solemn vision,
Tell her of things that no gross ear can hear;
Till oft converse with heavenly habitants
Begins to cast a beam on th' outward shape,
The unpolluted temple of the mind,
And turns it, by degrees, to the soul's
essence,
Till all be made immortal."

Conchology. See SHELLS.

Con'cord, a town of Middlesex County, Mass., 23 miles by rail from Boston. It was settled in 1635. As early as 1767 its people took a strong stand against the measures of the British. In February, 1775, the colonial government gathered valuable military stores at Concord. British spies visited the place, and an expedition from Boston to seize or destroy the stores was decided upon by General Gage. On the morning of April 19, 800 soldiers reached Concord. The country had been thoroughly alarmed; the people were engaged in concealing stores; and the militia, to the number of 180, had gathered when the enemy came in sight. Some were for resisting them, but, desiring to throw the blame of the attack on the invaders, Colonel Barrett led his men across the North bridge. While part of the British were destroying arms and provisions, a detachment marched to secure the North and South bridges. The Americans, believing the enemy were burning the village, marched toward the bridge, while the British drew up on the east bank and began to pull up the bridge-planks. They were commanded to stop, which they did; but a single gun, followed by a volley, was fired at the Americans. The minutemen answered with a volley also, and a general fusillade ensued, both sides losing several men. The British retreated to the center of the town, the Americans following and posting themselves along the Boston road. About noon the retreat began, the minutemen pursuing the British as far as Lexington. The Revolution was really begun by the skirmish at North bridge, where, as Emerson puts it, was "fired the shot heard round the world." Concord, out of a population of 1,300, sent 174 men to the army of 1775, the town raising the soldiers' pay. Concord is noted as the home of Hawthorne, Emerson, Thoreau, Louisa M. Alcott and Channing. Population, 6,421.

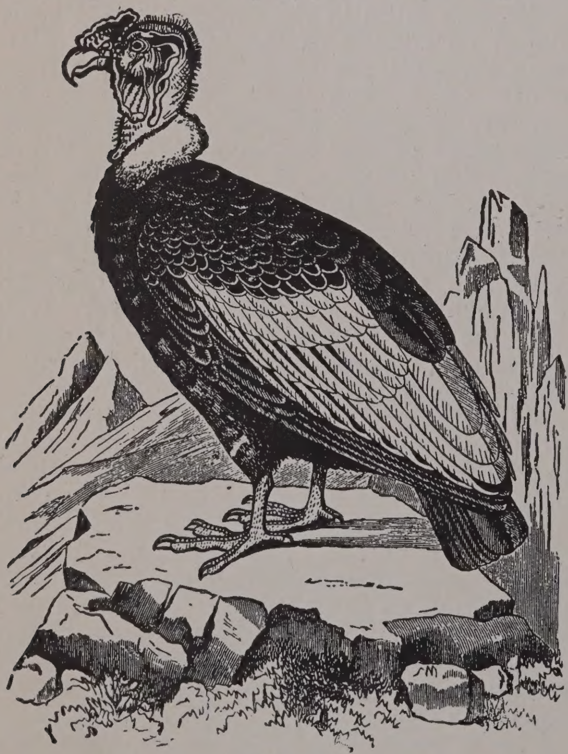
Con'cord, the capital of New Hampshire, is on the Merrimac River and has some handsome public buildings. The city has extensive water-power. It manufactures large numbers of carriages, also shoes, twine, leather-goods, silverware, electrical apparatus, machine-shop products; and has quantities of fine granite in its vicinity. An island in the Merrimac near the city is famous as the place where Mrs. Hannah Dustin and her nurse, with the aid of a boy, in 1697 killed ten Indians who had taken them captive. Concord was the home of the Penacooks, a powerful tribe of Indians. It was settled in 1725. Population 25,000

Concordat, The, of 1801, was an agreement between Pope Pius VII and Napoleon as first consul of France. This is the most famous of many such concordats between the popes and secular rulers. By the concordat of 1801 the national Catholic church was restored to France, though its administration was henceforth more dependent upon the government. Church property which had been seized was not to be restored, but the government was to provide for the support of a reduced number of bishops. As in English history of old, it was agreed that the government should select the bishops, but the pope invest them with their office. This concordat was replaced by similar agreements under different French governments. But there always was a strong party against having any state-church; and in 1906 it was disestablished and the concordat repealed.

Concrete, a composition of broken rock, gravel, broken bricks, sand, etc., usually cemented into solid form by the use of hydraulic cement. The proportions of the various ingredients differ according to the use to which the artificial stone called concrete is to be put, but the principle to be kept in mind in the mixing is that there should be enough of the mortar to a little more than fill the space between the fragments of broken rock, etc. A typical concrete is made of one part of cement, three parts of sand and five parts of broken rock. The mixing is usually done dry, only enough water being used to lay the dust, but more water is added when the stuff is tamped into position. Where concrete has to be laid down under water, it is usually put in position in bags. It is used for the foundations of structures of all sorts, for piers, fortifications, sidewalks and, recently, to a great extent in monolithic buildings, that is, buildings that are virtually one stone. In such buildings, as well as in many foundations, many iron girders and rods are imbedded in the concrete to add to its strength, and this is called reinforced concrete. The great earthquake in California made apparent the superiority of this kind of construction. Concrete was used extensively by the Babylonians, Egyptians, Greek and Romans. Some of their buildings have stood over 3,600 years. See CEMENT.

Conde (*kôn-dā'*), **Louis II of Bourbon, Prince of,** called the Great Condé, was born Sept. 8, 1621. He early started in his soldier's career. At the age of 22 he was given command of a French army and, against the advice of older generals who served under him, he fought the battle of Rocroi, and by skillful maneuvering and fierce charges made it a brilliant victory—the first in the reign of Louis XIV. Two hard-won victories in Germany and the capture of Dunkirk were followed by his winning the important battle of Lens in 1648, in which the formidable Spanish infantry were destroyed and the Thirty Years' War ended. The next year began the war of the Fronde, and, though Condé by his generalship had placed the young king on the throne, his pride had made him enemies at court. Soon after he was arrested, and, when set free, he at once put himself at the head of the troops of Bordeaux, which had rebelled. But he was no longer successful. Turenne defeated him twice; and, forced to leave the country and now fighting in the Spanish army, he was again overcome by the same general. Eight years afterward, having been allowed to return to France, the death of Turenne again brought him to the front. In three weeks he conquered Franche-Comté and fought William of Orange, (William III of Holland and England), though in a drawn battle which lasted for 17 hours. This was his last engagement, as the campaign had broken his health. He died Dec 11, 1686.

Condor, a very large bird of prey, living in South America, usually among the peaks of the Andes. It at one time was considered the largest bird of prey, but several species of the Old World are larger, and the Californian vulture reaches the same size. Before they were actually measured by Humboldt, fabulous stories were told in regard to their size and carrying-power. They were said to reach 30 or 40 feet in stretch of wing and to carry away sheep and children in their claws; but the toes are comparatively straight and the claws are blunt and not fitted for grasping. There is no authentic case of animals having been carried away by the condor. This structure of the foot makes it difficult for them to perch on trees and they prefer the bare rocks. They are sound sleepers, and may be caught with a noose while roosting. The plumage is a glossy black, with broad white bars across the wings and a collar or ruff of snow-white down around the neck. The latter is naked, and covered with wrinkled dull-red skin. They feed mostly on carrion, but are also fond of fresh meat and kill lambs, the goat and the young of cattle and deer. The white eggs are laid on inaccessible rocks, and the young cannot fly for about a year. They continue to hunt and roost with their parent for two years longer. Their plumage is brownish, and they have been called brown condors.



CONDOR

Conduction (in plants). See Water, Ascent of.

Cone (in plants), the characteristic cluster of seed-bearing scales developed by conifers and especially by the pines and their allies. The technical name of such a cluster is strobilus. See Conifers.

Co'ney Island, southeast of Long Island and barely separated from it by a rivulet, is a narrow strip of sand, five miles long and half a mile wide. It has a fine beach, which is lined with long rows of huge wooden hotels. Its nearness to New York and Brooklyn makes it a popular resort. The east end is called Manhattan Beach, and its broad hotel-verandas, promenades and well-laid-out grounds are patronized by the well-to-do. There are two large music-halls, with fine acoustic properties, the galleries open to the air, where the best musicians of New York give cheap summer-concerts. The west end is the most democratic resort in America, and its beach, bathing-pavilions, open-air restaurants and music-halls, toboggan-rollers and iron lookout-tower, 300 feet high, are crowded all summer by thousands of the ill-housed and sweltering men, women and children of the cities. Steamboats land every few minutes during the day at the tubular iron pier, 1,000 feet long; three railroads join Coney Island to New York and Brooklyn; and one surface and one elevated road carry the pleasure-seekers from one end of the island to the other.

Confed'erate States of America, The. When the Republican or antislavery party gained control of the government, by the election of Abraham Lincoln to the presidency, certain of the slave-states took steps to withdraw from the Union and establish a separate government. A convention assembled at Columbia, South Carolina, Dec. 17, 1860, but adjourned on the same date to Charleston, where, on the 20th, a resolution was passed declaring that the union hitherto existing between South Carolina and the other states under the name of The United States of America was dissolved. Other states were quick to follow. In less than six weeks Mississippi, Florida, Alabama, Georgia, Louisiana and Texas passed ordinances of secession and withdrew from the Union. On the 4th of February, 1861, delegates from six of these states met in convention at Montgomery, Alabama, and organized a new government, with the title of The Confederate States of America. On the 8th of the same month, the organization was completed by the choice of Jefferson Davis of Mississippi as president and Alexander H. Stephens of Georgia as vice-president. The seceded states at once seized, with few exceptions, all the forts, arsenals, navy-yards, military stores and other Federal property within their limits.

The Civil War followed, beginning with the attack on Fort Sumter on April 12. On the 17th Virginia seceded and joined the Confederacy. Arkansas followed on May 6, North Carolina on the 20th of the same month and Tennessee on June 6, making 11 states in all. The history of the Confederacy is confined to the years of the Civil War, and it ceased to exist with the surrender of the Confederate army at Appomattox, Va., April 9, 1865.

Confu'cius (*kon-fū̆'shē-us*), the great Chinese sage, was born in the state of Lu, in 551 B. C. His father, an old soldier, died when Confucius was three years old, leaving him and his mother very poor. For a while he had charge of the public stores and the public herds. At 22 he began his career as a teacher. In 501 a new ruler made him governor of the town of Chung-tu, where he brought about a striking reformation in the manners and morals of the people. Soon after, he became a minister of state and the most powerful man in Lu. For three years he was as successful in ruling and reforming the people as he had been when only a town-governor. Under his rule dishonesty was unknown; loyalty and good faith were the characteristics of men. Confucius was now the idol of the people. But soon a breach was made between him and his ruler, and for 12 years, with a company of disciples, he traveled through other Chinese states, teaching as he went. Sometimes the company were welcomed by high princes; at others they had not enough to eat, and even were in danger of their lives. A new ruler summoned the sage back to Lu, where he died the eleventh day of the fourth month, 479 B. C. Confucius thought his life a failure, but he was hardly dead when a temple was built in his honor, and to-day every market-town has its Confucius temple, and twice a year the emperor does honor to the greatest and wisest of Chinese philosophers. Of no ancient person do we know more than we do of Confucius. Not only what he taught, but just how he looked and acted at court, while talking to his disciples, at his table or in his bed has been handed down to us. Confucius was a great moral teacher and his supreme teaching was his negative golden rule: "What you do not wish done to yourself, do not do to others." He never pretended to be anything more than a man, but he knew the right way for each man to live and to be right himself, and for the ruler so to rule as to make men happy and good. China is his monument.

Congo Free State grew out of the International Association, which was formed in 1878 with King Leopold of Belgium at its head. The European powers recognized the state in 1885, and in 1890 its territories were declared inalienable, though a convention between Belgium and the Independent State reserved to the former the right of annexing the latter after a period of ten years. In 1901 this right was renewed, and in 1908 the annexation took place, chiefly owing to the desire of the Belgian people to protect the natives who, under the selfish rule of King Leopold of Belgium, had been treated as his private property and most cruelly worked and abused.

The Congo Free State has a narrow seacoast, with the Congo as its northern boundary, and in the interior widens north and south, extending to Lakes Albert Edward and Tanganyika. The people of the Congo basin are of the Bantu race. They are harmless, and born traders, and are lighter in color than the Sudanese. The European population numbers 3,399, chiefly Belgians, Portuguese, Italians, English and Americans. The chief districts are Boma, Bangala, Aruwimi, Lualaba, Kwango, Equator, Ubangi and Stanley Pool. The area is estimated at 900,000 square miles and the population at 15,000,000 or 16,000,000.

The chief imports are fabrics, food, machinery, steamboats, drink, metals, arms and ammunition; the exports consist of rubber, ivory, palm-nuts and oil, coffee and cocoa.

The forests from which the rubber comes were graphically described by Livingstone (*q. v.*), and the description still holds:

> Into these primeval forests the sun, though vertical, cannot penetrate, except by sending down at mid-day thin pencils of rays into the gloom. The rain water stands for months in stagnant pools made by the feet of the elephants. The climbing plants, from the size of a whipcord to that of a man-of-war's hawser, are so numerous, that the ancient path is the only passage. When one of the giant trees falls across the road, it forms a wall, breast high, to be climbed over, and the mass of tangled rope brought down makes cutting a path round it a work of time which travellers never undertake.

While the great explorer's graphic description referred to the forests of what is known as "the Manyema Country" west of Lake Tanganyika it is an equally good picture of the forest extending eastward to Albert Nyanza. This great territory is practically all forest and a weird region of eternal twilight inhabited by the pygmies, monkeys, and other members of the great African managerie.

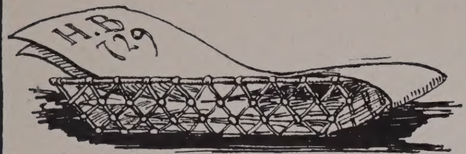
Con'go, French. See French Congo.

Con'go, The, is the great river of equatorial Africa and the second largest river in the world. Its mouth was discovered by Diego Cam in 1482, who set up there a pillar and called it the Pillar River. The Portuguese following him did not go far into the interior, and called it the Zaire, a native word meaning "the river." The country thereabout was called the Congo, and the map-makers gave the name to the river. Captain Tuckey, in 1816, wished to see if it was not a mouth of the Niger, and with his boats went up the first navigable part, 110 miles; but many of his men sickened and died, and for half a century the river was avoided by all but the hardy slave-traders. Livingstone, between 1867 and 1871, while exploring between Lakes Nyasa and Tanganyika, found a large river flowing to the north, which he thought to be the Nile. Five years later, Stanley, exploring in the same lake-region, gazed on the mighty stream, and, following its course to its mouth, proved it to be the Congo. Lake Bangweolo is the reservoir from which the Congo issues, called there the Luapula. Flowing north, it widens into Lake Moero; from here, as far as Nyangwe, its name is the Lualaba; from Nyangwe to Stanley Falls Stanley named it the Livingstone; and from Stanley Falls to its mouth it is known as the Congo. It is 3,000 miles long, and drains an area of 1,600,000 square miles. It discharges a body of water into the Atlantic second only in volume to the Amazon. Its two largest branches are the Kasai from the south and the Mobangi from the north. The Congo is divided into the lower, the middle and the upper river. The lower river is navigable for its entire length up to the rapids, a distance of 110 miles, for steamers of 18-foot draught; the middle river is unnavigable through the cataract region, extending 255 miles to Stanley Pool. The upper river, as far as Stanley Falls, is navigable for 1,068 miles to steamers of four-foot draught.

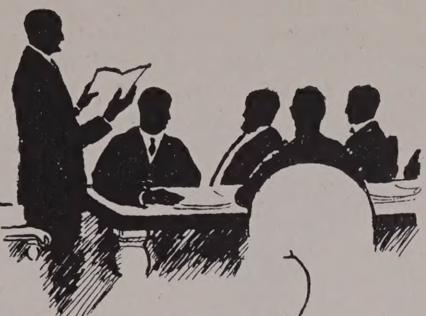
Congress of the United States, the legislative or law-making body. There are two houses, the House of Representatives and the Senate. The Senate is made up of two members from each state, elected by direct vote for six years. One-third of the Senate is elected each two years. There are ninety-six members of the Senate. The Representatives are elected by popular vote every two years, the number of members from each state depending upon its population. A new apportionment is made every ten years in accordance with the decennial census. There are 435 members of the House. The Vice President of the United States is the president of the Senate; the House elects its own Speaker. All money or appropriation bills must originate in the House. The Senate has sold power of impeachment and of confirming or rejecting important appointments made by the President. Besides its legislative functions the Senate is intrusted with the power of ratifying or rejecting all treaties made by the President with foreign countries, a two-thirds majority of Senators present being required for ratification. Congress lasts two years and has two sessions. Under the 20th Amendment of the Constitution the Congress assembles at least once a year, "and such meeting shall begin at noon on the 3d of January, unless they shall by law appoint a different day." The President can call the Congress in special session. Adjournment occurs on a day agreed upon by both houses. Every bill which passes the two houses is sent to the President for his approval or disapproval. If he disapproves or vetoes it, he returns it to the house where it originated and usually gives his reasons for doing so; if it is passed again by a two-thirds vote in both houses, it becomes law. The powers of the Congress are limited and separated from those of the state legislatures by the federal Constitution. By the Fifth Article of the Constitution (which see), Congress has the power to propose alterations and amendments to the Constitution. The salary of either a senator or a representative in Congress is $10,000 a year. The Speaker receives $12,000 a year. There is also an allowance for traveling expenses, and for stationery and similar expenses. The representation of the various states in the House in 1934 was as follows: Alabama 9; Arizona 1; Arkansas 7; California 20; Colorado 4; Connecticut 6; Delaware 1; Florida 5; Georgia 10; Idaho 2; Illinois 27; Indiana 12; Iowa 9; Kansas 7; Kentucky 9; Louisiana 8; Maine 3; Maryland 6; Massachusetts 15; Michigan 17; Minnesota 9; Mississippi 7; Missouri 13; Montana 2; Nebraska 5; Nevada 1; New Hampshire 2; New Jersey 14; New Mexico 1; New York 45; North Carolina 11; North Dakota 2; Ohio 24; Oklahoma 9; Oregon 3; Pennsylvania 34; Rhode Island 2; South Carolina 6; South Dakota 2; Tennessee 9; Texas 21; Utah 2; Vermont 1; Virginia 9; Washington 6; West Virginia 6; Wisconsin 10; Wyoming 1; also there are two territorial delegates representing Alaska and Hawaii, and a resident commissioner from Puerto Rico, none of which has a vote.

The first colonial Congress met in New York, Oct. 7, 1765, made up of delegates from nine colonies. A second Congress, which met at Philadelphia, July 5, 1774,

HOW A BILL BECOMES A LAW



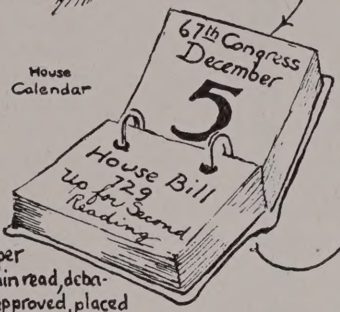
By placing the Bill in a basket for that purpose, a member introduces it into the House of Representatives. It is given a number, such as H.B. 729. After the first reading, the Bill is sent to the proper Committee.



After considering the Bill, the Committee either "pigeonholes" it, or reports it back to the House, recommending that it be
1. Passed
2. Rejected
3. Amended

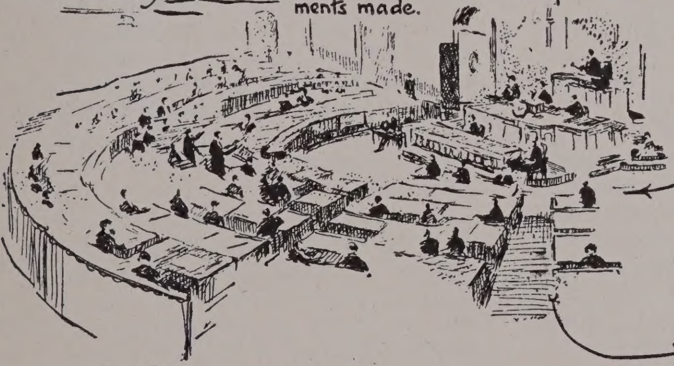
It is then placed on the House Calendar for action.

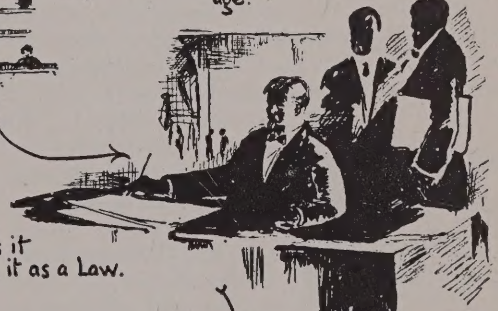
NOTE–
The House Committees number about forty-eight, the chief being
1. Ways and Means
2. Appropriations
3. Judiciary
4. Foreign Relations
5. Military Affairs
6. Naval Affairs
7. Commerce
8. Rivers and Harbors
9. Rules
10. Currency



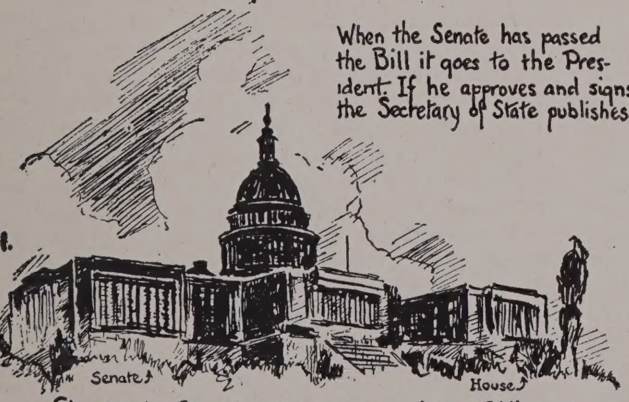
On the proper day it is again read, debated, and, if approved, placed again on the Calendar, On the third reading a vote decides whether or not it shall pass with the amendments made.

If passed by the House, the Bill is sent to the Senate. Bills originating in the Senate are introduced by a Senate member. The Bill then goes through much the same procedure as in the House.
1. First Reading.
2. Proper Committee
   - a. Finance
   - b. Commerce
   - c. Appropriations
   - d. Foreign Relations
   - e. Interstate Commerce
   - f. Military Affairs
   - g. Naval Affairs
   - h. Public Expense
   - i. Judiciary
   - j. Rules
3. Reported back with recommendations.
4. Second Reading and Debate
5. Third Reading. Vote on Final Passage.

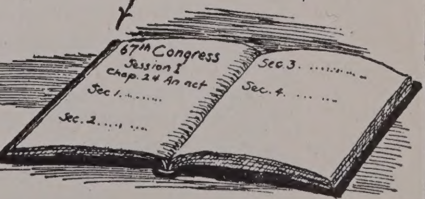




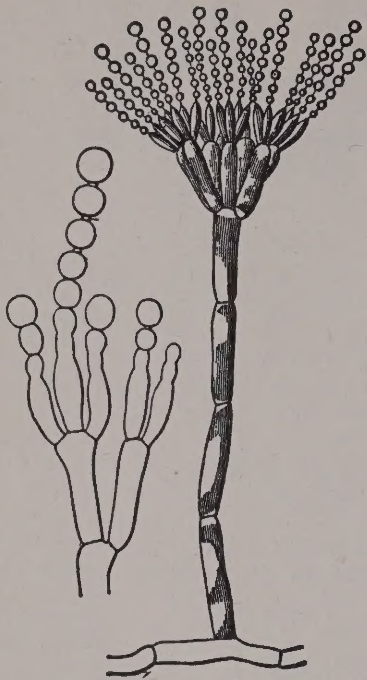
When the Senate has passed the Bill it goes to the President. If he approves and signs it the Secretary of State publishes it as a Law.



Should the President disapprove of the Bill, and veto it, it can become a Law only if voted on again and given a two-thirds vote in both Houses.

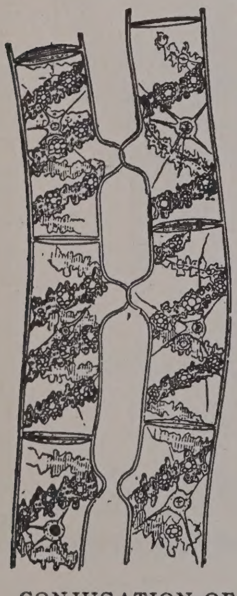

67th Congress
Session I
Chap. 24 An act
Sec. 1. ....
Sec. 2. ....
Sec. 3. ....
Sec. 4. ... ...

representing all the colonies but Georgia, set forth the well-known Declaration of Rights. This body became known as the Continental Congress, and on July 4, 1776, adopted the Declaration of Independence. The first congress of the United States met in New York in 1789 with 26 senators and 65 representatives. The next year it moved to Philadelphia, and in 1800 to Washington. See Woodrow Wilson's *Congressional Government;* Cooley's *Constitutional Limitations;* Von Holst's *Constitutional Law of the U. S.;* and Bryce's *American Commonwealth.*


CONIDIA

Conid'ia (in plants), asexual spores of certain fungi, which are formed by cutting off a series of cells from special branches of the mycelium, resulting in more or less extensive chains of spores which separate easily. Such spores are well displayed by the mildews and the æcidium forms of rusts. They are often called conidiospores. The singular of the name is conidium.

Co'nifers, the greatest group of living gymnosperms, containing such plants as the pines, spruces, hemlocks, firs, redwoods, cedars, cypresses, junipers, yews. The species are characteristic of the temperate regions of the northern and southern hemispheres, and are almost entirely absent from the tropics. Among them are some of the most valuable timber-trees, and the yearly inroads upon them for lumber, unless properly controlled, will result presently in their extinction. Their most characteristic features are the central shaft which never breaks up into branches the evergreen needle-leaves, the cones and the soft and very evenly-grained wood. They are a very ancient group, their remains occurring in great abundance in the earlier rocks. See GYMNOSPERMS.


CONJUGATION OF TWO FILAMENTS OF SPIROGYRA

Con'jugate Plants, a group of the green algae, in which different plants become united together by connecting tubes, through which fertilization is effected. The common pond-scum or *Spirogyra* is an example. See CHLOROPHYCEÆ.

Conjuga'tion. A process of fertilization occurring in certain of the lower plants (*Thallophytes*), in which the sexual cells (*gametes*) which unite to form the spore are alike in appearance, there being no distinction of male and female.

Conk'ling, Roscoe, American politician, was born at Albany, N. Y., Oct. 30, 1829; and died at New York, April 18, 1888. In 1846 he removed to Utica, N. Y., where he became district attorney, and was mayor in 1858. He was elected to Congress, and in 1879 to the Senate. In the practical business of both houses he took an active and prominent part, serving on important committees, and was instrumental in securing much useful legislation. He took an active part in the reconstruction of the southern states, and advocated resumption of specie-payments. He opposed President Johnson's policy and zealous championed Grant's administration; and in June, 1880, nominated Grant for a third term. In 1881 he resigned his seat in the senate, owing to Garfield's exercise of control over appointments in his native state. In 1882 he was appointed associate-justice of the supreme court but declined. See his *Life and Letters.*

Connaught, Arthur, Duke of, Governor General of Canada (1911-1916), is the third son of the late Queen Victoria of England. Both in character and attainments, the duke was regarded as eminently qualified for the chief executive of the Dominion. Before his appointment he had served with distinction in the British army, traveled widely and availed himself of the opportunity to study the affairs of the empire at first hand. He was born in 1850. The duchess was Princess Louise of Prussia. The duke commanded the Guards brigade at Tel-el-Kebir and was mentioned three times in the dispatches.

Connecticut (*kŏn-nĕt'ĭ-kŭt*) (name derived from Indian word meaning land on the long tidal river occupies the south western corner of the New England states. Its northern boundary is Massachusetts, 88 miles, its eastern, Rhode Island, 45 miles, western, New York, 72 miles. On the south 100 miles of irregular coast afford numerous good harbors, the best of which are New Haven and New London. The area of the state is 5,004 square miles. The census of 1900 gave a population of 908,420. A school census in 1907 showed a population of 1,037,614, and the latest census gives a population of 1,500,000.

The rivers are the Connecticut, navigable to Hartford, the Housatonic and the Thames, navigable through the tidewater. The various tributaries are the Farmington, the Naugatuck, the Shepaug, the Willimantic, the Quinnebaug and the Shetucket.

Ranges of hills cross from north to south, dividing the state into the eastern upland, the central lowland, the western upland and, south of these, the coast section. The rounded and fertile hills of the eastern upland have a lower average elevation than those of the western section, which in the extreme northwestern corner reach the height of 2,355 feet. The hills of the western upland are rugged and steep, broken by bold bluffs of trap-rock.

Nearness to the ocean renders the climate less severe than that of inland states of the same latitude. The weather is changeable. The mean annual temperature is 50°.

The geological formation of the state is interesting. Ridges of trap-rock are numerous through the central portion. These ridges, forced up through red sandstone, slope abruptly to the west and gently to the east. Copper and lead, both combined with silver, are found in Hartford County. Copper was formerly mined, the first copper cents used in America being made from Connecticut copper. Later the mines proved unprofitable and were abandoned. In the western part of the state a rich deposit of iron has been mined since 1730. Limestone, marble, brownstone (freestone), granite and slate are quarried. The timber includes hickory, oak, chestnut, butternut, beech, birch, maple, ash, elm. Much valuable forest-land remains, in spite of the large tracts which have been cleared. Scientific protection and increase of forests are encouraged by a state-forester and the Yale school of forestry.

Four causes combine to make Connecticut prominent as a manufacturing state: the favorable location geographically, ease of transportation by land and water, excellent water-power and the inventive genius of the people. Among the manufactured products are small hardware of all sorts, machinery, india-rubber goods, paper, silver-plated ware, hats, clocks and watches, thread, musical instruments, typewriters, sewing-machines, firearms and ammunition carriages, bicycles and motor-vehicles. cotton and woolen-fabrics and silk-fabrics. One large shipyard and two smaller ones do a considerable amount of shipbuilding. The New York, New Haven and Hartford Railroad, with its branches and trolley-lines, covers the state. Steamers run from New York to New Haven, New London, Bridgeport and Hartford.

Agriculture is second in importance among the industries. Of the crops raised, hay is the most valuable and has the largest acreage. The soil of the upper valley of the Connecticut is a deep, rich loam, especially suited to tobacco-raising. Much tobacco is raised here and in the Housatonic valley. The highlands are devoted largely to dairy-farming, the west and southwest to market-gardening. Orchard-fruits are an important crop. Fishing for bluefish is followed along the shore, where there are also valuable shell-fisheries. The Connecticut yields a fair catch of shad.

History. The first permanent settlements were made at Saybrook (1635), Hartford (1636) and New Haven (1637). Prominent men of this period were the Rev. Thomas Hooker and the Rev. Samuel Stone, who led about 100 men, women and children from Massachusetts to Hartford; John Winthrop, jr, afterward governor, who was commissioned by Lords Say and Brook to establish a fort at the mouth of the Connecticut, named Saybrook for its owners; and the Rev. John Davenport and Theophilus Eaton who founded the New Haven colony. The Indians of the Pequot, Narragansett and various smaller tribes were practically exterminated by the settlers in 1637.

Connecticut is known as the Constitution State from the fact that almost the first constitution adopted by vote of the people was drawn up and adopted by the Connecticut colony in 1639. In 1662 Gov. John Winthrop, jr, obtained a charter from King Charles II granting to the colony an unusual degree of independence. The hiding of the charter in an oak must be relegated to legend. It was, however, not surrendered at the demand of Sir Edmund Andros, royal governor of New England, but was withheld until 1689, when it was produced and the colonial government re-established. The charter provided the accepted form of government until the adoption of the present constitution in 1818. Its terms and forms have been largely preserved in the constitution, and still are the organic law of the state. A convention held in 1902 to consider the revision of the constitution accomplished nothing. Representation under this constitution is institutional, the towns in existence in 1818 having two representatives each, the towns incorporated later having one or more representatives as the population is below or above 5,000. The system has proved efficient and has worked no injustice.

The state furnished 40,000 soldiers during the War of the Revolution. Jonathan Trumbull, then governor, was a valued friend and adviser of Washington. William A. Buckingham, governor at the outbreak of the Civil War, made the record of the state in that war remarkable for promptness and zeal. Nearly 55,000 volunteers went from Connecticut.

Immigration has changed the character of the population to a considerable extent in recent years. It is now 1,254,926.

Education. Supervision of the public-school system is in the hands of a board appointed by the legislature. Financial assistance of the towns is provided by a fund derived from the sale of Connecticut's share of land in the Western Reserve and by high-school grants, larger and more generally applicable than in any other state. The minimum school-year covers 36 weeks, the longest required by any state. Enforcement of child-labor laws is under the charge of the state board of education, and attendance laws are rigidly observed. Higher institutions of learning include Yale University, New Haven; Wesleyan University, Middletown; Trinity College, Hartford; Hartford Theological Seminary, Hartford; and Berkeley Divinity School, Middletown. The state maintains normal schools at New Britain, New Haven, Willimantic and Danbury. An agricultural college is maintained at Storrs by funds obtained in part from the U. S. government and in part from the state.

Connect'icut River, the largest in New England, is 450 miles long and is navigable to Hartford. It rises in New Hampshire, forms the boundary line between that state and Vermont, crosses Massachusetts and Connecticut, and enters Long Island Sound. Its many falls afford abundant water-power, and along its whole course it is noted for its beauty.

Con'nellsville, Pa., situated in the southwest of the state, about sixty miles southeast of Pittsburg, is the center of the United States coking-coal trade. It may be visited by branches of the Pennsylvania and Baltimore and Ohio railroads. In addition to the coking-coal industry, it has steel mills, coal-mines, brick-works and pump and machine-works. Population 15,000.

Conrad, Joseph (Korzeniowski), (1857–1924). An ocean vessel was many days from land, churning through the illimitable Pacific waters. A university man of England, who was journeying on board, was surprised to be accosted by one of the officers of the ship.

"Here," said the man of the sea, "is something I should like to have you read." He placed in the traveler's hand a manuscript. Several days later he asked him what he thought of the story, and if it were worth printing.

"Decidedly," said the university traveler.

The man of the sea was Joseph Conrad, who is considered by many persons the greatest narrative writer of his period, and whose sea tales are classic, and known everywhere. The manuscript appeared in book form as *Almayer's Folly.*

Mr. Conrad's literary career began comparatively late in life, after a career from able seaman to captain on the seas for over twenty years.

He was born in Poland, the son of a landed and educated family, but the liberal views of his father, who worked for the freedom of his country from Russia, wrought havoc to the family fortunes, and they were forced to flee.

At the age of fifteen, Joseph began his sea life on the Mediterranean. Shortly afterwards he sailed on an English sea vessel for China. Then commenced his years of ocean life. Then only did he begin to learn the English language, the one language, he afterwards said, in which he could best express himself. After many years there came to him the urge to write of his experiences, and he set them on paper.

Encouraged, he began to publish his books. The first, *Almayer's Folly*, appeared in 1895, and won him immediate recognition. His tales are generally of the sea, and the retiring nature of the author, combined with the physical and mental prowess of one who pictures himself objectively performing heroic deeds, is noticeable in many of his leading characters.

Among his works are: *The Nigger of the Narcissus* (1899), *An Outcast of the Islands* (1896), *Lord Jim* (1900), *Youth and Other Tales* (1902), *Romance* (1903), *Nostromo* (1904), *The Mirror of the Sea* (1906), *The Secret Agent* (1907), *A Set of Six* (1908), *Under Western Eyes* (1911), *'Twixt Land and Sea Tales* (1912), *Chance* (1914), *Within the Tides* (1915), *Victory* (1915), *'The Shadow Line* (1917), *The Arrow of Gold* (1919), *Rescue* (1920), *Notes on Life and Letters* (1921), *The Rover* (1923).

Conservation of Energy. The fact that energy is conserved or preserved without loss or gain, where to all appearance there are successive loss and gain of energy, is well-shown in the pendulum. By energy we mean capability to do work. When the pendulum is at the height of its swing, it may be said to be stationary. Though it seems then to have no energy, yet, owing to its elevation, it has *potential* energy, for it has the capacity to move with constant acceleration down to the bottom of its swing. There it is moving at its maximum rate, and has a maximum of kinetic energy or energy of motion, though it has lost the potential or static energy with which it started, which was due to its position and the attraction of the earth. This kinetic energy is enough to carry the pendulum up to a similar position on the other side. There again the kinetic energy has disappeared, for the pendulum is, as it were, still, but the same amount of potential energy is present as at first, for the pendulum is now ready to move as at first, though in the opposite direction. The pendulum, considered as a pendulum, now has potential energy equal in amount to the kinetic energy which it had before; for it has the power to move the same weight (*i.e.*, its own weight) through an equal distance, at the same average rate, as when it was moving at the bottom of its swing.

So, at every point in the swing, the loss of potential energy is made up by an equal gain in kinetic energy, and *vice versa.* It is true that a pendulum will, after a time, stop swinging. But this is because forces outside it are acting upon it. There are the friction of the point on which it swings and the resistance of the air, etc. But the original energy of the pendulum is not lost. For, if we measure the energy of the heat which the friction and the resistance cause and the energy of the other motions of the air, etc. caused by the pendulum while it was swinging, we shall find that in that heat, motion, etc. there is just the same amount of energy, kinetic or potential, as that with which it started. The pendulum, its fulcrum or point of support, the air, the earth, etc. here form a conservative system. For any system of bodies, where the sum of the energy which its parts possess remains unchanged (through whatever changes, in position or motion, those parts may have passed) is a conservative system. Every system of bodies that so far has been studied with respect to its energies has been found to be a conservative system. If we *assume* that the universe is fundamentally a system of material bodies and that it obeys, as a whole, the same laws of conservation that we observe in its parts, then the energy of the universe, of course, is always the same. That it always is the same is the *theory of the conservation of energy.* It is a theory, and not a fact of observation.

The *proof* of the conservation of energy depends upon our power to change one form of energy into another and to bring them all to one standard of measurement. The common standard of measurement for all energies is the erg, which is based upon the force found necessary to produce upon a gram of matter a velocity of one centimeter a second. The form of energy to which all other energies can be reduced is that of heat. The proof, therefore, of the conservation of energy in any system depends upon the measurement of heat in terms of motion. That heat could so be measured was advanced as a theory by Count Rumford and Sir Humphrey Davy in 1798, and by Julius Robert Mayer in 1842; but it was first publicly demonstrated by James Prescott Joule in 1843. In 1845 he was able to state that the energy required to heat one gram of water at 1° C. is the same as that required to lift about 423 grams to a height of one meter. This result is very near that which is at present accepted.

In any and all systems, in whatever processes they undergo, *there takes place also transformation of available into useless energy.* The useless energy is called the entropy of the system.

The theory of the conservation of energy is not understood until it is supplemented by this theory of the destruction or dissipation of *available* energy in all systems and throughout the universe. The grandest application of this theory open to us is undoubtedly the recognition of the sun and the earth, together with the surrounding ether, as a conservative system. Then the transformation of the heat of the sun into light, into the uplift of waters from the oceans, into the chemical energy of plants and of animals, into the resultant deposits of sediment and the erosion of mountain-ranges, into the heat of coal and the energy of Niagara, with all the applications of these forces to meet human necessities; the spectacle of all these countless changes and productions is dominated by the thought that of the energy thus poured forth none is lost, but abides in a potential or a kinetic form. And yet the *available* energy is continually diminished, as these changes, one and all, end their career in the form of heat, thereby continually diminishing the difference of temperature between the sun and that which surrounds it. Nevertheless we must remember that, admirable and consistent as these theories of conservation and entropy appear, they are subject to revision with the advance of knowledge and of mechanical art. PERCY HUGHES.

Con'stable, John (1776-1837). English landscape painter. Among famous works are: *The Cornfield, The Lock, Flatford Mill, The Valley Farm.*

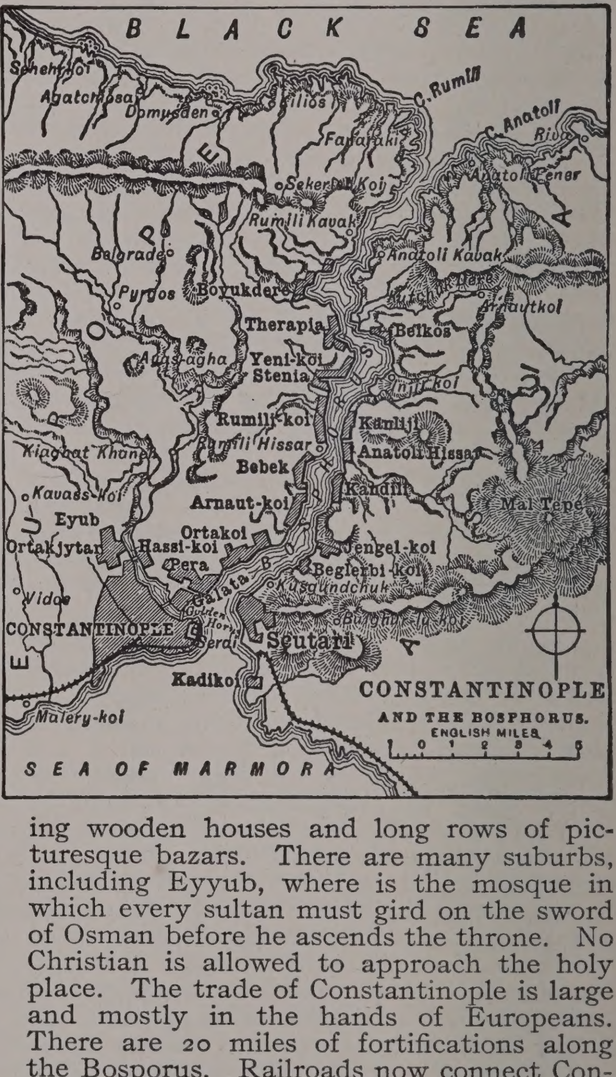
Con′ stance, Lake, lies 1,290 feet above the sea, between Switzerland and Germany, north of the Swiss Alps. It is forty-two miles long and seven and a half miles in average width, covering an area of 208 square miles; its greatest depth is 906 feet. The Rhine flows through it from east to west. The shores are formed by hilly lands; cornfields, vineyards, orchards and wooded hills, with here and there a ruined castle, surround the lake. The water is dark green, and in the spring often rises ten or twelve feet after a thaw. The fisheries are important.

Constantine I (*kŏn′stan-tīn′*), Roman emperor, called the Great, born 274 A. D., was the son of Constantius Chlorus. When 22 years old, he served as a soldier in Egypt and in Persia. In 305 Constantius and Galerius became emperors respectively of the west and the east. Constantine was now in the army of Galerius, who saw a possible rival in the young leader's brilliant genius and popularity among the soldiers, and so took every means to place him in danger. But Constantine hastily joined his father in the west, and on his death succeeded him in 306. However, things got into a muddled condition two years later, for six emperors were ruling at once, three in the east and three in the west. Constantine thus found himself opposed by two rivals, Maximian and Maxentius, father and son. The father took refuge in Marseilles, and, when about to be given up by the people, killed himself. The son gathered a large army, but Constantine, quickly crossing the Alps by the Mt. Cenis pass, worsted him twice, and utterly crushed him in the battle of the Milvian Bridge in 312. It is asserted that Constantine, while on the march and near the Alps, saw a flaming cross in the sky, with the inscription: "By this, conquer." During the rout Maxentius was forced off the bridge and drowned. The night before the battle, it is said, Constantine saw a vision, in which he was told to place the monogram of the name of Christ on his soldiers' shields. In this way the standard of the cross came (after 323) to be borne by the Roman soldiers; and a year later, the eastern emperor, Licinius, joined with Constantine in granting Christians freedom of worship and the rights of Roman citizens. That Constantine became a Christian himself at this time is doubtful; but during his reign Christianity was made the state-religion, the heathen temples were closed, and toward the end of his life the great emperor was baptized. Linicius, now sole ruler in the east, was next conquered and put to death, and in 330 the western emperor, now sole master of the Roman world, made Byzantium his capital, changing its name to Constantinople, the city of Constantine. He died May 22, 337.

Constantine I. of Greece, who succeeded his father King George (*q. v.*), was forced by the Allies to abdicate in favor of his second son Alexander in 1917. He was born August 3, 1868, and was married in 1889 to Sophia, youngest sister of Emperor William of Germany. The action taken by the Allies was due to his alleged pro-German activities. On the death of Alexander in 1920 from the bite of a pet monkey, Constantine was recalled to the throne, but again abdicated in 1922.

Constantino'ple, capital of the Turkish empire, called Stamboul by the Turks, was formerly the ancient town of Byzantium and capital of the Byzantine or Eastern Empire. A colony from Megara settled it about 658 B. C., and its commanding position caused it to be fought for by Persians, Gauls, Greeks and Romans. In the fourth century Philip of Macedon lay siege to it, but was driven off by an Athenian army. The story is that the Macedonians' whereabouts was discovered by a crescent which shone out in the sky; so, ever since, a crescent has been the badge of the city. In 330 A. D. Constantine was so taken with its fine site that he made it his capital, giving it his own name, by which it is now known. Of the 26 sieges and eight captures it has suffered, that by the crusaders in 1204 was the worst, when all that was beautiful in the city, the church-treasures and even the bodies of the dead were plundered. In 1453 Constantinople fell before the conquering Turk and has never been besieged since, chiefly, in modern times, because of the renown of the Ottoman empire and, later still, because of the jealousy of the European powers, which would not allow any one of them to capture the prize of the Bosporus.

Stamboul or Constantinople proper stands on the site of old Byzantium, south of the Golden Horn, a creek five miles long, half a mile broad and deep enough to float near to the shore the Turkish ironclads. The 14 miles of walls first built by Constantine still encompass the city. Stamboul, like Rome, has its seven hills, where over 200 beautiful mosques and countless chapels rise from a mass of tumble-down, ill-smelling wooden houses and long rows of picturesque bazars. There are many suburbs, including Eyyub, where is the mosque in which every sultan must gird on the sword of Osman before he ascends the throne. No Christian is allowed to approach the holy place. The trade of Constantinople is large and mostly in the hands of Europeans. There are 20 miles of fortifications along the Bosporus. Railroads now connect Constantinople with Paris and other European cities and also with towns in Asia Minor. Population, 1,200,000.


BLACK SEA
Sehehr-koi
Agatchosa
Domusden
Kilios
C. Rumili
C. Anatoli
Riva
Fanaraki
Seker-Koi
Anatoli Fener
Rumili Kavak
Anatoli Kavak
Belgrade
Pyrgos
Boyukdere
Therapia
Belkos
Arnautkoi
Ayas-agha
Yeni-koi
Stenia
Injir-koi
Rumili-koi
Rumili Hissar
Kanliji
Anatoli Hissar
Kiaghat Khan
Bebek
Kavass-koi
Eyub
Arnaut-koi
Kandili
Mal Tepe
Ortakoi
Ortakjytar
Hassi-koi
Pera
Jengel-koi
Beglerbi-koi
Kusgundchuk
Galata
Golden Horn
Vidos
CONSTANTINOPLE
Serdi
Scutari
Kadikoi
Malery-koi
SEA OF MARMORA
CONSTANTINOPLE
AND THE BOSPHORUS.
ENGLISH MILES
0 1 2 3 4 5

Constitution, The, or **Old Ironsides.** A famous American naval vessel. A 44-gun frigate of 1576 tons, she was launched Sept. 20, 1797. She took part in the operations against the pirates in the Mediterranean in 1803—the recapture of the Philadelphia and the bombardment of Tripoli. In the war of 1812, she brought renown to the American Navy. Aug. 19, 1812, under Capt. Isaac Hull, she fought and destroyed the British ship Guerriere and Dec. 29, of the same year, under Capt. Bainbridge, she won a hard fought battle with the Java, which she destroyed. Under Capt. Stewart she captured four prizes in 1814, and Feb. 20, 1815, she captured, after a terrific fight, the Cyane and the Levant. In 1830 she was condemned to be broken up, but Oliver Wendell Holmes published his thrilling poem "Old Ironsides," which aroused public protest, and the grand old ship was saved. She was rebuilt and did further service, crossing the Atlantic for the last time in 1878. In 1897 she was retired to the Boston Navy Yard, where she did service as a barrack ship.

Consul, Mercantile, the name given to those officers a nation maintains in a foreign country for the protection of its trade and the rights of its merchants and to whom the further duty is assigned of keeping the home-government informed of all facts bearing on the commercial interests of the country. The practice of maintaining these consular agents had its origin among the trading cities of Italy in the 12th century. It has since gradually widened, and in the 16th century had become a regular custom throughout Europe. The consul's first duty on reaching his post is to show his commission to the authorities of the country and receive their sanction of his appointment. This sanction is called an *exequatur* —from the Latin word meaning to perform or execute. Consuls attend mostly to commercial affairs, such as examining and viséing a ship's papers, taking note of losses at sea, providing for disabled seamen, making regular reports on prices of crops; while in some half-civilized countries the consul is a judge. Treaties are made giving the consular court power to settle all disputes between citizens of his own country. This is usually the case in some North African and Asiatic states, where the lives and property of foreigners could not safely be left to depend on their poorly carried-out laws. In 1908 Congress passed a law for the reorganization of the American consular service, which had fallen far behind the commercial requirements of the times, and the law took effect on July 1.

Consumers' League. The consumers' leagues are organizations, chiefly of well-to-do women, to encourage proprietors of retail stores and of factories to treat their female and child employees well. The first league was formed in England in 1890, but the Consumers' League of the City of New York was organized next year. It was incorporated in 1898. Besides 63 leagues in 22 states, there are now *national* consumers' leagues in France, Germany and Switzerland as well as in America. The *National* Consumers' League deals with *factories*, and issues a label certifying that the goods have been manufactured in factories where the state's factory-law is obeyed, where ten hours are the maximum day's labor, where children under 16 are not employed, and where the inspection of the Consumer's League is welcomed. It also works for the passage of state and national laws to improve the condition of factory workers, especially of women and children. Its main office is located in New York City. The general secretary is inspector and missionary for the league. Its work has been heartily endorsed by the president of the United States.

The state and city leagues adopt the regulations of the National Consumers' League, regarding the manufacture of goods; and also aim to improve the condition of retail stores, by drawing up a list of "fair houses," where proper conditions prevail. Members of the leagues give these stores the preference. Stores where men only are employed are not taken under consideration.

Contin'ua'tion-Schools, in the proper sense of the term, have scarcely any place in systems of public instruction in the United States. But, on the one hand, the need of such schools in order to supplement the education gotten in day schools either by liberal or vocational training is being more and more urgently felt; and, on the other hand, a beginning has been made by the Young Men's Christian Associations and by private enterprise. The evening-schools which are being conducted in connection with many city-school systems are at present little more than schools for the illiterate; but genuine continuation-courses are already being offered in them to a small extent in New York City and elsewhere. Such continuation-work as is to be had is patronized chiefly by apprentices, assistants in business houses and offices and machine-operators. There is need of more advanced training for journeymen and skilled workers. It is clear that vocational training is felt to be the essential function of the continuation-school. The older method of apprenticeship has well-nigh disappeared, and only the continuation-school can take its place and improve upon it.

Probably Massachusetts has done more than the other states in the direction of providing continuation-schools which are more than mere evening-schools for illiterates. Most important is the success of her three state textile-schools at Lowell, New Bedford and Fall River. While there are comparatively few day students, for obvious reasons, the night attendance (by mill operatives) is very large.

The Sun Rises

Constitution of the United States of America. Fifty-five wearied men arose from their seats in a room of Independence Hall, Philadelphia. Benjamin Franklin, aged and grey, spoke to some other members of the body as they stood looking at a picture of the sun behind the chair in which George Washington had sat as chairman. Relieved in mind, and smiling at Washington and the others, he said, “I had not been able to tell whether it was a rising or a setting sun. Now I know that it is the rising sun.”

Guarding Liberties

Franklin was thinking of the many disagreements that had arisen over the matter that the body of men had met to solve—the formation of the Constitution of the United States. From May 25 until September 17, 1787, the convention had been in session. Great conflicts of opinion had been voiced regarding the powers which should be surrendered by the States to the Federal Government, and over the relative strength of authority which should be given each State by virtue of its size and population. But the great document had at last been signed. No other document like it had ever been written in the world. It joined the States into the United States of America, and it became the parent of many later constitutions which were modeled on it by new republics in South America and elsewhere. More than that, it gave concrete expression and practice to the democratic hopes of the world which were being then expressed in France, and liberalized many monarchies.

Background of Our Nation

In the beginning, the colonies had been separate and individually responsible only to Great Britain. A certain union of interests opposed to the colonial government of Great Britain had caused the colonies to work in harmony at times, but the union was purely voluntary, and not effective. Indeed, it was not until 1781, five years after the first battles of the Revolutionary War had been fought, that a real government of any kind had been established by the Articles of Confederation. These Articles, however, had so sturdily protected States' rights that the Federal Government found its powers so limited it could be of little real service. No absolute foreign policy could be put into effect, and interstate commerce and relations were decided, unhappily, by individual States. In 1786 the Annapolis Convention met in the hope of securing better State relations, but failed in its purpose. Something must be done; something was done—the year 1787 brought the adoption of the Constitution. The document was then given to the states for ratification. Delaware signed first, on December 7, 1787. The Constitution became effective following the ratification of New Hampshire, June 21, 1788. Eventually all the States signed, Rhode Island last, on May 20,1790, by the close vote of 34 to 32.

The Original Seven Articles

The Constitution is the basic law of the United States. In general, it provides for the Legislative, Executive, and Judicial Departments, defines the powers granted to the States, the Federal Government, and to both.

The original Constitution contained seven articles in brief and in part as follows:

Article 1 treats of the Legislative (law-making) Department, establishing a Senate and a House of Representatives. The House of Representatives shall be composed of members chosen every second year by the people of the several States. The Representative must be at least 25 years of age, a citizen of the United States for at least 7 years, and an inhabitant of the State choosing him. The number of representatives is to be apportioned among the States according to population, but shall not exceed one in every thirty thousand; however, each State shall be entitled to at least one representative. The House is given the right to choose its Speaker, and the sole right of impeachment.

The Senate shall be composed of two Senators from each State, chosen by the Legislature thereof, for a term of six years. Regulations are provided for whereby one-third of the number of Senators should be elected every two years. The Senator must be at least 30 years of age, 9 years a citizen of the United States, and an inhabitant of the State choosing him. The Vice-President of the United States is made President of the Senate, but has no vote unless the vote of the Senate is equally divided. The Senate has the sole power to try all impeachments.

Congress is caused to assemble at least once in every year, such meeting to be on the first Monday in December unless they shall by law appoint a different day. Each House is given power to determine its rules of procedure, and expel a member by a two-thirds vote. All bills for raising revenue must originate in the House of Representatives. Other bills may originate in either House, and when passed upon by both, submitted to the President. If he signs the bill, it becomes a law. If he vetoes the bill, it shall not become a law unless favorably passed upon by both Houses by a two-thirds vote. If the President does not return the bill within ten days, Sundays excepted, the bill becomes a law.

Congress is given power to lay and collect taxes, duties, and imposts, to pay public debts, provide for the common defense, borrow money, coin money, establish uniform naturalization laws, establish post-offices, secure copy-right and patent laws, declare war, grant letters of marque and reprisal, raise and support armies, provide for a navy, provide for the calling forth of the militia, to exercise exclusive legislation over such district as may be the seat of Government, and to make all laws necessary to execute its powers.

Congress is prohibited from suspending the writ of habeas corpus except when public safety shall demand, passing an ex post facto bill, laying a duty or tax upon articles exported from any State, granting preference to ports of one State over another, grant any title of nobility.

States are prohibited from entering any treaty, alliance, or confederation; neither may they coin money, grant titles of nobility, or enter into any contract with another State.

Article 2 treats of the Executive Department. A President is vested with executive power. He is granted a term of four years, the term of the Vice-President running concurrently. Provisions are then made regarding the appointment of electors from each State who shall vote for President, the one receiving the second highest vote becoming Vice-President.

It is required that the President be a natural born citizen of the United States, a resident within the United States for 14 years, and at least 35 years of age. The President is made Commander-in-chief of the Army, Navy, and Militia. He is given power to make treaties by and with the advice and consent of the Senate, two-thirds concurring. He is given the power to nominate, and, with the advice and consent of the Senate, appoint, ambassadors, other ministers and consuls, judges of the Supreme Court, and all other officers whose appointments are not otherwise provided for. He is required from time to time to give Congress information of the state of the Union, and to recommend for their consideration such measures as he believes to be wise and necessary. It is also provided that the President, Vice-President and all civil officers may be removed on impeachment for and conviction of treason, bribery, and other high crimes and misdemeanors.

Article 3 treats of the Judicial Department. The judicial power of the United States is vested in one Supreme Court, and in such inferior Federal courts as Congress may provide. The judicial power extends to all cases of law an equity arising under the Constitution, laws, treaties; to all controversies to which the United States shall be a party; to all controversies between two or more States, between citizens of different States, and between a State and foreign States. The trial of all crimes, except impeachment, shall be by jury, and the trial shall be held in the state where the crimes shall have been committed.

Article 4 treats of powers of States. Each State must give full credit to the public acts, records, and judicial proceedings of every other State. A State is required to deliver to another State upon Executive authority any person charged with treason, felony or other crimes who shall have fled from the State having jurisdiction. Provision is made for admitting new States into the Union by Congress, but no new State shall be formed within any other State, or by junction of two States, or parts of States, without the consent of the Legislatures of the States concerned, as well as of Congress. The United States guarantees to every State in the Union a Republican form of Government, and shall protect every State against invasion, and against domestic violence upon application of the Legislature or the Executive if the Legislature can not be convened.

Article 5 treats of method of amendment of Constitution. Congress, by two-thirds vote of both Houses, may propose amendments to this Constitution, or, on the application of the Legislatures of two-thirds of the States, shall call a convention for proposing amendments, which shall become a part of the Constitution when ratified by the Legislatures of three-fourths of the several States, or by conventions in three-fourths thereof, provided that no State, without its consent, shall be deprived of equal suffrage in the Senate.

Article 6 treats of contracts, supreme law of the Constitution, and oath required of government officials. All debts contracted before the adoption of the Constitution are made valid. The Constitution and the laws of the United States and all treaties are made the supreme law of the land, and the judges in every State are bound thereby. The Senators, Representatives, members of the State Legislatures, and all executive and judicial officials of the United States and of each State are required to be bound by oath or affirmation to support the Constitution, but no religious test shall ever be required as a qualification to any office or public trust under the United States.

Article 7 states that ratification of nine States shall be sufficient for the establishment of the Constitution among the States so ratifying.

Ten Original Amendments

The first ten amendments to the Constitution were proposed at the first session of the First Congress, at New York, in 1789. Submitted to the States, they were adopted by the number necessary, and became a part of the Constitution in 1791. These amendments are in effect a statement of rights, both to the State and to the individual. They were inserted as a positive guarantee of rights which the original Articles intended but did not define specifically. In brief and in part, they provide as follows:

Article 1. Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof, or prohibiting freedom of speech or of the press, or the right of persons assembling peacefully to petition the Government for redress of grievances.

Article 2. A militia being necessary, the right of the people to keep and bear arms shall not be infringed.

Article 3. No soldier, in time of peace, shall be quartered in any house without owner's consent.

Article 4. The right of people to be secure in their persons, houses, papers and effects, and against unreasonable searches shall not be violated, and no warrants shall issue except upon probable cause, supported by oath and affirmation, and particularly describing the place to be searched, and persons or things to be seized.

Article 5. Except in cases of land or naval forces, or of militia when in actual service in time of war or public danger, no person shall be answerable to capital or other infamous crime unless on presentment or indictment of a Grand Jury; nor any person put twice in jeopardy of life and limb for the same offense; nor compelled to be a witness against himself in crime; nor be deprived of life, liberty or property without due process of law; nor shall private property be taken for public use without just compensation.

Article 6. In all criminal cases the accused shall have right to a speedy and public trial, by an impartial jury of the State and district wherein the crime shall have been committed.

Article 7. In common law suits, where value in controversy exceeds $20, right of trial by jury shall be preserved.

Article 8. Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

Article 9. Enumeration in Constitution of certain rights shall not be construed to deny others retained by the people.

Article 10. The powers not delegated to the United States, nor prohibited by the Constitution to the States, are reserved to the States or to the people.

Judicial Powers

In 1794 the Third Congress proposed to the Legislatures of the several States an amendment regarding judicial powers, which was declared ratified by the President in 1798. This amendment, *Article 11*, limited the Federal courts so that they did not exercise jurisdiction in any suit in law or equity prosecuted against one of the United States by citizens of another State, or by citizens or subjects of foreign powers.

Choosing the President

The Eighth Congress submitted to the State Legislatures the next amendment, *Article 12*, in 1803, and in 1804 the Secretary of State declared it had been ratified. The amendment provides that the Electors shall meet in their respective States and vote by ballot for President and Vice-President, recording all votes cast. These ballots shall be sealed and addressed to the President of the Senate. The person receiving the greatest number of votes shall be President, if such number be a majority of the whole number of electors appointed, and if no person have such majority, then from the persons having the highest number, not exceeding three, the House of Representatives shall choose immediately by ballot, the President. If the House fails, the Vice-President shall act as President after March 4.

Slavery Abolished

In 1865, the Thirty-eighth Congress presented to the Legislatures of the several States the thirteenth amendment, *Article 13*. In December of the same year the Secretary of State, by proclamation, stated that the amendment had been ratified. The amendment provides that neither slavery nor involuntary servitude shall exist within the United States, or any place subject to their jurisdiction except as a punishment for crime. Delaware and Kentucky rejected the amendment, when proposed; Alabama and Mississippi ratified it. Texas took no action.

In 1866 the Thirty-ninth Congress proposed to the Legislatures of the several States the

Citizenship Rights

amendment which became Article 14, by proclamation of ratification by the Secretary of State in 1868. It declares that all persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and the State wherein they reside. The amendment also provides if certain male citizens qualified to vote for President and Vice President are prohibited by a State from so doing, that State's representation in Congress shall be reduced in the proportion which the number of such male citizens shall bear to the whole number of male citizens twenty-one years of age in the State.

White and Colored Citizens

In 1870, Article 15, the next amendment, was declared ratified. It provides that the right of citizens to vote shall not be denied or abridged on account of race, color, or previous condition of servitude. Congress was given authority to enforce this article by appropriate legislation.

Income Tax

Article 16 was declared ratified on February 25, 1913. Under it Congress is given authority to lay and collect taxes on incomes, from whatever sources derived, without apportionment among the several States, and without regard to any census or enumeration.

Popular Election of Senators

Article 17 was proclaimed ratified on May 31, 1913. Under its provisions the members of the United States Senate are elected by direct popular vote instead of by the legislatures of their respective states as was done prior to its ratification.

Prohibition

Article 18 was declared ratified on January 16, 1919. It provided that after one year from the date of its ratification, the manufacture, sale or transportation of intoxicating liquors within, the importation thereof into, or the exportation thereof from the United States and all territory subject to the jurisdiction thereof, for beverage purposes was hereby prohibited.

Woman Suffrage

Article 19 was declared ratified on August 20, 1920. It provides that the right of citizens to vote shall not be abridged by the United States or by any state on account of sex. Congress shall have power to enact such laws as shall be necessary to enforce this amendment.

"Lame Duck" Amendment

Article 20 was approved by the Congress on March 1 and 2, 1932, and submitted to the States for their approval. It was ratified on September 29, 1932. Section 1 provides that the terms of the President and Vice President shall end at noon on the 20th day of January, and terms of senators and representatives at noon on the 3rd day of January, of the years in which such terms would have ended if this article had not been ratified and the terms of their successors shall then begin. Section 2 provides that the Congress shall assemble at least once each year, and such meeting shall begin at noon on the 3rd day of January, unless they shall by law appoint a different date. Section 3 provides that if at the time fixed for the beginning of the term of the President, the President-elect shall have died, the Vice President-elect shall become President. If a President shall not have been chosen before the time fixed for the beginning of his term, or if the President-elect shall have failed to qualify, then the Vice President-elect shall act as President until a President shall have qualified, and the Congress may by law provide for the case wherein neither a President-elect nor a Vice President-elect shall have qualified, declaring who shall then act as President, or the manner in which one who is to act shall be selected, and such person shall act accordingly until a President or Vice President shall have qualified. Further provisions are made in Section 4 in cases of death or disqualification.

Repeal of Prohibition

Article 21 repeals the provisions of the Eighteenth Amendment, or as it is here listed Article 18. An interesting feature of this amendment is that whereas all preceding amendments to the Constitution were ratified by the legislatures of the various states, this amendment was ratified by conventions of delegates elected for the sole purpose of voting on it. It was approved by the Congress on February 20, 1932. Utah was the thirty-sixth state to ratify this amendment, the vote occurring on Tuesday, December 5, 1933. Proclamation of ratification was made immediately. Liquor can be sold legally in those states not having laws prohibiting it.

Amendments Not Ratified

There have been over 3,000 amendments to the Federal Constitution proposed in the Congress since 1789. Of that number, twenty-one have been passed by the Congress and ratified by the legislatures of the states or in the case of Article 21 by state conventions. Six other amendments have been approved by Congress, but have never been ratified by the States. Two of these amendments were approved by Congress in 1789, one in 1810, one in 1861, and one in 1924. As no time limit was set as to the ratification of any of these amendments, each or all could be ratified by the States to-day and become a part of the Constitution. The Child Labor amendment, however, which was approved in 1924, and would have given Congress power to regulate labor of persons under eighteen years of age, was rejected by thirteen states before the end of 1925.

The 1861 amendment was ratified by but three states. It is known as the Corwin Amendment and would have prohibited any amendment to the Constitution abolishing or interfering within any State with institution of slavery.

One of the most interesting of the amendments that failed of ratification is the one approved by Congress in 1810. It would have deprived of his citizenship any person accepting any "present, pension, office or emolument from any emperor, king, prince or foreign power." This passed Congress by overwhelming majorities, nineteen to five in the Senate and eighty-seven to three in the House. It was ratified by twelve States and needed but one more State's approval for its adoption. The South Carolina Senate approved it, but the House of that State failed to take similar action. It appeared in some public documents as having been approved and was listed for a time as the thirteenth amendment to the Constitution.

The two amendments approved by Congress in 1789, but failing of ratification, concerned the compensation of members of Congress, and the apportionment of the House of Representatives. The one relating to compensation provided that no alteration of existing rates of pay take effect before the next election. It was ratified by six States and rejected by five. The other which was ratified by nine States and rejected by one, read as follows:

"After the first enumeration, there shall be one Representative for every 30,000 until the number shall amount to 100, after which the proportion shall be so regulated by Congress that there shall be no less than 100 Representatives nor less than one Representative for every 40,000 persons until the number of Representatives amount to 200, after which the proportion shall be so regulated that there shall not be less than 200 Representatives nor more than one Representative for every 50,000 persons."

The most recent attempt to amend the Constitution that has proved ineffectual is the amendment to regulate the hours of labor for children, which was finally approved by the Congress in 1924. This amendment reads as follows:

Section 1—The Congress shall have power to limit, regulate, and prohibit the labor of persons under eighteen years of age.

Section 2—The power of the several States is unimpaired by this article except that the operation of State laws shall be suspended to the extent necessary to give effect to the legislation enacted by the Congress.

This joint resolution was adopted by the Sixty-eighth Congress, approved by the House, 297 to 69, April 26, 1924, and by the Senate, 61 to 23, June 2, 1924; proposed to legislatures of the States of the Union by the action of Congress, but adopted only by Arizona, Arkansas, California, Montana and Wisconsin. Legislative action upon it up to 1933 had been as follows: Ratification by one house of the legislature in New Mexico, and Nevada; rejected by one house of the legislature in Idaho, Louisiana, Michigan, Nebraska, North Dakota, Ohio, Oklahoma, Oregon, and Wyoming; indefinitely postponed by one house in Colorado and Iowa; no definite action taken by Alabama, Illinois, Mississippi, New Jersey, New York, and Rhode Island; rejected by both houses in Connecticut, Delaware, Florida, Georgia, Indiana, Kansas, Kentucky, Maine, Maryland, Massachusetts, Minnesota, Missouri, New Hampshire, North Carolina, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia.

It is of interest to note that the action of a State legislature in rejecting an amendment is not binding on succeeding legislatures. The same amendment can be called up in a later legislature, and if a large enough number of votes are cast for it, it can be ratified.

Constitution, The, the most famous vessel in the history of the United States Navy, a 44-gun frigate which is perhaps better known as *Old Ironsides.* The ship was built at Boston in 1797, and put to sea in the following year under Captain Nicholson for service against the French. In 1801-05, she was Preble's flagship in the war with Tripoli. Under Captain Isaac Hull the *Constitution* did valiant service in the War of 1812. She participated in the first and last naval battles of the war. On August 19, 1812, after an engagement of thirty minutes with the *Gerriere* she left the latter vessel a total wreck. Later in the year under command of Captain Bainbridge she captured the *Java* off Bahia, Brazil. In 1815 she captured the *Cyane* and the *Levant,* British ships, the latter being recaptured by a British squadron. In 1828 the *Constitution* was reported unseaworth and ordered broken up, but Oliver Wendell Holmes saved her from destruction by his stirring poem, *Old Ironsides,* by which name the ship is now popularly designated. As a result of this agitation the ship was rebuilt in 1834. Again in 1877 she was rebuilt, and in 1927 for a third time the famous ship was reconstructed. The school children of the nation contributed their pennies to defray the expense of the most recent rebuilding.

Consul, the title of the two highest ordinary magistrates in the Roman republic, also, in modern terminology, the title of an agent commissioned by a sovereign state to protect its commercial interests in a foreign port or town, and keep the home government informed of all facts pertaining to the commercial interests of his country. In Rome the title of *consules* seems first to have been used about 300 B. C. At first the consuls differed little from kings except in their limited tenure of office. They were originally from the patrician class, but later the consulship was opened to plebeians. In the modern consular service of the United States there are more than 1,000 representatives. Larger commercial centers have two or more consuls. Consular reports on commercial matters are published by the Bureau of Statistics.

Convolvulus, Wild Morning-Glory, a common white or pink-and-white wildflower of wayside wall and bank. It is much like the cultivated morning-glory of the home-garden, but is a hardier plant; the flowers are less frail and remain open longer, and it is perennial. It is also called Hedge-Bindweed, also Lady's Nightcap. It grows as far south as North Carolina and west to Nebraska, and blooms from June to August. It is a rapid grower and a great twiner, the Latin name *Convolvulus,* meaning little twiner. On moonlight nights the flower remains open, giving welcome to visiting moths. To the *Convolvulus* family belongs the sweet-potato vine; and also a member of this family is that bane of the farmer, dodder, small or field bindweed.

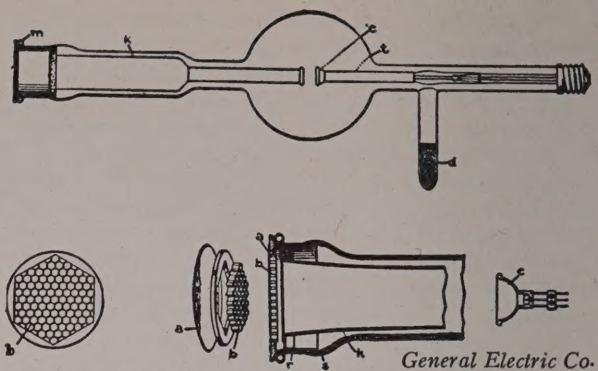
Cook Islands. Capt. Cook in 1773 discovered a number of islands between 8° and 23° south latitude and 157° and 170° west longitude. These number six principal and a number of smaller islands, which with several others were attached to New Zealand for administrative purposes in June, 1901. Rarotonga, the chief island, is 20 miles in circumference and has 2,060 inhabitants. The total population is 6,324.

Cook, James, Captain, a great English navigator, was born Oct. 28, 1728, the son of a farm-laborer. In 1755 he entered the royal navy and became a master-mariner, and at this time surveyed the shores of Newfoundland and the St. Lawrence. In 1768, as lieutenant in command of a ship, he sailed to Tahiti with an expedition to observe the transit of Venus. On the return voyage he sailed around New Zealand for the first time, mapped its coasts and explored the east side of Australia.

His second voyage was spent exploring the lands of the Antarctic on the edge of the sea of ice.

His third voyage was made as captain in charge of two ships. After discovering Hawaii, which he named the Sandwich Islands, he followed the North American coast, trying to find a northwest passage from the Pacific to the Atlantic. He reached Bering Strait, but, forced to turn back, he made Hawaii in 1779. Here he was murdered by the islanders Feb. 14, 1779. Captain Cook, perhaps more than anyone else, added to our knowledge of the Pacific and Antarctic Oceans. His surveys also have stood later tests and been found accurate.

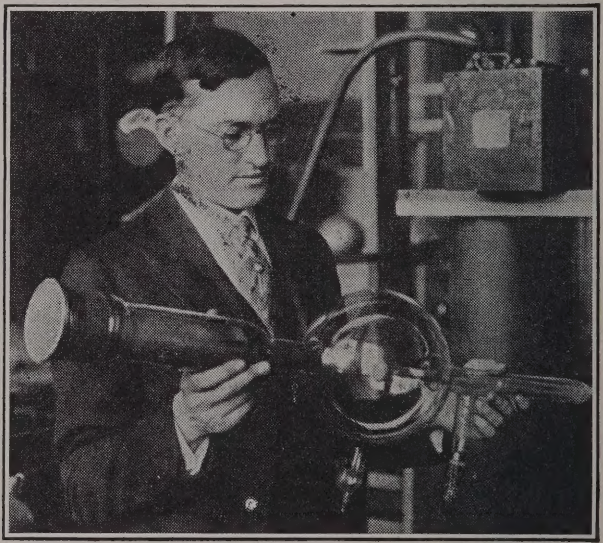
Coolidge Cathode Tube. Rays as powerful and numerous as those flying from a ton of radium, containing billions of electrons speeding 150,000 miles a second—these are what the Coolidge cathode tube produces. It is a glass tube from which the air has been removed and into which an electric charge may be passed. It contains a tungsten filament which is heated and has a charge of 350,000 volts passed through it. Billions of electrons are thrown out into the tube, and caught in a cap which guides them through an inch of space in the vacuum tube. They are then led through an inner metal tube to a thin nickel window in the wall of the glass. This Coolidge nickel window—half of one-thousandth of an inch thick—is solid enough to keep out the air, but most of the racing electrons fly right through it. They strike billions of air atoms, knocking billions of electrons from them, which produce a purple light. The electrons passing through the nickel window are called Lerned rays. Lerned first invented a tube through which the rays could pass, but not strong enough to withstand high voltage. Dr. W. C. Coolidge, of the General Electric Company, overcame that difficulty.



General Electric Co.

DIAGRAM OF COOLIDGE TUBE

Top: General construction. Lower left: Window support to protect against air pressure. Lower center: Anode window shown separate, and attached to tube. Lower right: Cathode cup. Letters indicate as follows: a—Anode window; b—Window support; c—Cathode cup; d—Charcoal trap for gases; k—Copper shield; m—Water-cooling tube; r—Sleeve; s—Glass seal; t—Cathode shield.



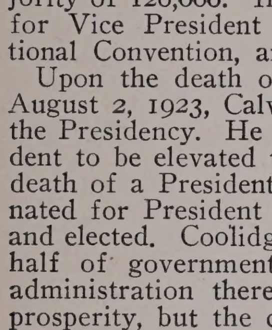
General Electric Co.

LABORATORY VIEW

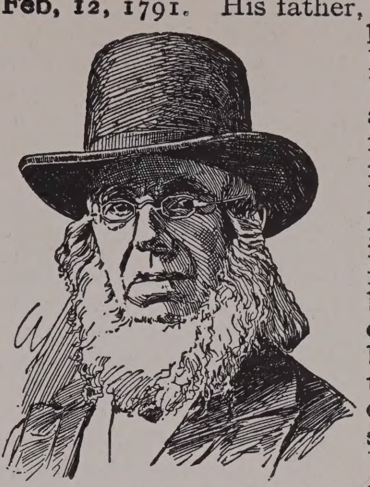
What is the nature of the rays? Experiments were made. Different articles were passed into the rays. Bacteria were killed. Window glass turned purple, salt turned brown. Castor oil became solid. For the future, the new tube would help scientists learn more about the realm of electrons and atoms.

Coolidge, (John) **Calvin,** the twenty-ninth man to serve as President of the United States. He was born at Plymouth, Vermont, July 4, 1872. His early youth was spent on a farm. He later entered Amherst College, and was graduated from there in 1895. He then read law, was admitted to the bar, and established himself at Northampton, Massachusetts. In 1910 he was elected Mayor of Northampton. He served in the lower house of the Massachusetts legislature for four terms, and in the senate for three terms. He then became lieutenant governor of the state, and in 1918 was elected governor. His apparently masterful handling of the Boston police strike made him a national figure and led to his re-election as governor by a majority of 120,000. In 1920 he was nominated for Vice President by the Republican National Convention, and elected that Autumn.

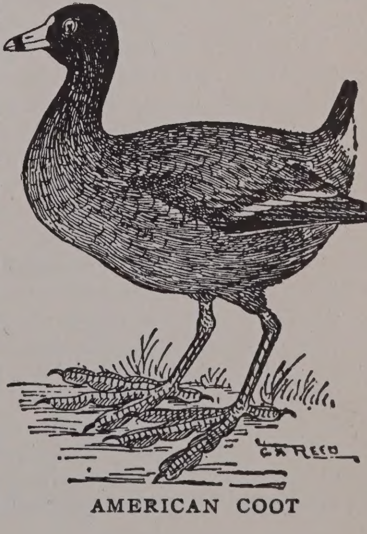
Upon the death of President Harding on August 2, 1923, Calvin Coolidge acceeded to the Presidency. He was the sixth Vice President to be elevated to the Presidency by the death of a President. In 1924 he was nominated for President by the Republican party, and elected. Coolidge spoke repeatedly in behalf of government economy. During his administration there was marked industrial prosperity, but the condition of the farmers was far from satisfactory. In 1928 President Coolidge announced that he did "not choose to run." There was much agitation in favor of his re-election, but he refused to allow himself to be considered. In 1905, Coolidge was married to Miss Grace A. Goodhue. Mrs. Coolidge was one of the most gracious ladies ever to occupy the White House. Former President Coolidge died January 5, 1933.


JAMES F. COOPER

Cooper, James Fenimore, American novelist, was born at Burlington, N. J., Sept. 15, 1789. After three years at Yale he entered the navy, rising to the rank of lieutenant. His first novel was a failure; but in 1821 *The Spy* made him popular. Following this came *The Pioneers*, the first of the famous *Leather-Stocking Tales.* In 1823 appeared *The Pilot*, the earliest of his sea-tales. Throughout his life he was a busy writer, now correcting the false impressions of his country which he found current in Europe, now writing a novel to give expression to his views of politics, now ridiculing his countrymen's faults and anon bringing out sketches of travel. But his fame rests on his early novels, the best of which have been translated into most of the languages of Europe and into some of those of the east. He, practically, was the first American in American literature. He died Sept. 14, 1851.


PETER COOPER

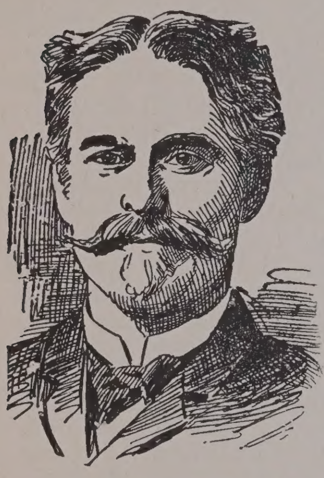
Cooper, Peter, was born at New York, **Feb, 12, 1791.** His father, who had been a lieutenant in the Revolutionary War and was a hat-manufacturer, was not successful in business, and had a large family to provide for. So Peter's boyhood was one of hard labor. He went to school half of each day for a single year. When 17, he was apprenticed to a coachmaker, and pleased his employer so much that he offered to set him up in business, which he declined. After trying different branches of trade, he began the manufacture of glue and isinglass, which he carried on for 50 years. Seeing what profits could be made in iron, he built several mills. In 1845 he erected at Trenton, N. J., the largest rolling-mill at that time in the country for the manufacture of railroad-iron. He first succeeded in using anthracite coal in puddling iron; was the first to roll wrought-iron beams for buildings; and also designed and built the first locomotive made in America, which was used on the Baltimore & Ohio Railroad. In his own youth Cooper had greatly felt the lack of means of study in the line of his trade, and he determined that other artisans should have a better chance. So Cooper Union, to which Mr. Cooper gave $800,000 in all, was built. It covers a whole block in the center of New York city. Here young mechanics and others receive night-lessons in engineering, mining, metallurgy, chemistry, architectural drawing and building. There also are schools of design, telegraphy, wood engraving, photography, etc. The Union is free to all who choose to attend. Besides the school proper there are free lectures, a free library and reading-room, art-galleries, models of inventions and


AMERICAN COOT

other facilities and equipments. Cooper died April 4, 1883.

Coot, a water-bird, also called mudhen and crow-duck. It differs from the rail in having lobed toes, which assist in swimming. It is about 14 inches long, with a short tail, with a slaty-black plumage and some white marks near the tail. The bill is pointed and ivory-white, distinguishing it from the duck. It breeds in bogs, and frequents quiet pools and rivers, but prefers the neighborhood of small muddy ponds. The food is water-insects, small fish, worms, seeds, grass, etc. It lays from eight to 12 eggs, yellow-buff in color and marked with fine dots and spots of brown and very faint lilac lines.

Cope, Edward Drinker (1840-97), one of the most distinguished of American naturalists. He was of Quaker descent and was widely known in the field of comparative anatomy. For many years he was editor of the *American Naturalist* and professor in the University of Pennsylvania. He made extensive collections of the fossil vertebrates from the rocks of the western states, and filled his house in Philadelphia to overflowing with them. He prepared several monographs for the United States government. He was a voluminous writer, but most of his writings were technical. As examples of his many publications we mention only *Origin of the Fittest* and *Tertiary Vertebrates of North America* (1889). He died at Philadelphia on April 12, 1897.



E. D. COPE

Co′penha′gen, the capital of Denmark, is on the island of Zealand, with outlying parts on the island of Amager and the mainland. The city is defended by fortifications recently built and by old forts, especially by the citadel of Frederikshavn. The square, *Kongens Nytory*, is the center of the town's life. Its cathedral has a baptismal font by Thorwaldsen, and the Thorwaldsen museum has many of that sculptor's works. The royal castle, called Christiansborg, has a fine art-gallery, some of the pictures in which were burned in 1884. The university, founded in 1479, has 85 professors, 400 students and a library of 250,000 volumes; while the royal library has over 500,000 volumes. Copenhagen in the middle of the 12th century was a mere fishing-village. It was made the capital in 1443. The town has had three fires, and has been besieged and bombarded many times. It was in its fine harbor that Nelson, in 1801, destroyed the Danish fleet. The annual trade of the port amounts to about $120,000,000. Its industries embrace ship-building, distilling and brewing, sugar-refining, the manufacture of porcelain, soda, machinery and textile fabrics. Population, 462,161; or with its suburbs, 559,398.

Copernicus (*kō-pẽr′-nĭ-kŭs*), **Nicolaus,** the founder of modern astronomy, born at Thorn in Prussia, Feb. 19, 1473; died at Frauenburg, May 24, 1543. Previous to the time of Copernicus—or, roughly speaking, previous to the discovery of America—there existed among scholars a great variety of views regarding the structure of the solar system and regarding its relation to the fixed stars. The chief merit of Copernicus is that he first solved in a fairly satisfactory manner the great problem of the motion of the planets. If not the first to propose, he certainly was the first to work out, in detail, an explanation which is so simple as to command acceptance from everyone who clearly understands it. Instead of assuming, as the Egyptians and the Greeks and most people after them had done, that the earth is the center of the solar system, Copernicus assumed that the sun is the center, that the earth and the other planets revolve about the sun in circular orbits and that the earth rotates on its own axis. There are a number of details which Copernicus was unable to explain because he did not know that the orbits of the planets are elliptical, as was proved later by Kepler. Copernicus was educated at the University of Cracow, whither he went in 1491. Later he spent some years of study at Bologna and Padua, and at the latter place he took the degree of doctor of medicine in 1499. In 1503 he went to Frauenburg, where he practiced medicine and held several important offices in the church. The years from 1507 to 1530 were spent in the preparation of his immortal book: *The Revolutions of the Heavenly Bodies*, which, however, was not printed until after his death in 1543. The defense of the Copernican system was, therefore, left largely to his successors, principally among them to Giordano Bruno of Italy and to Galileo. The position of Copernicus in history may be more easily retained in memory, if the student will recall that he and Michael Angelo were contemporaries, there being only two years' difference in their ages. On the day that Michael Angelo died, Feb. 18, 1564, Galileo, the great defender of Copernicus, was born; while in the year that Galileo died, 1642, the illustrious Newton, who was to perfect and simplify the Copernican system, was born in England.

Copley (*kŏp′lĭ*), **John Singleton,** an American painter, was born at Boston, Mass., July 3, 1737. When only 16, his portraits were admired. Washington sat to him in

1755, and later, in London, he painted the king and queen (George III and his consort). Here, also, he became the friend of such men as West and Reynolds. Some of his best works are *Death of Lord Chatham, Death of Major Pierson, Charles I Demanding the Surrender of the Five Members* and the *Assassination of Buckingham.* His historical paintings are perhaps superior to those of West, and his portraits rank with those of Reynolds and Gainsborough. He died at London, Sept. 9, 1815.

Cop'per. This appears to have been the first metal used by man, both in war and in the peaceful arts. Like gold and silver, it is found native, sometimes in great masses, as on the south shore of Lake Superior, where blocks of many tons' weight have been obtained. The use of copper by ancient nations is well-known, through the many collections in museums of weapons and other objects of bronze, that is, copper mixed with a small quantity of tin. The ancients obtained most of their copper from Cyprus; hence the name. Copper has a fine red color, takes a brilliant polish, and is nine times heavier than water. Next to silver it is the best conductor of heat and electricity. It is moderately hard and highly tenacious, though not so strong as iron. The largest masses of native copper are found in the mines of Russia and in our own Lake Superior region. Copper is used in many ways. With other metals it makes brass, bronze and gun-metal; alone, it is used for boilers, cooking-vessels, pipes, wire, nails, spikes; in thin plates it is used for engraving and etching, and in strong rollers for calico-printing; as an electro-deposit it is used in copying engravings and pages of type for the printing-press. Copper is usually employed for lightning-conductors. Yellow metal, an alloy of copper, is used in sheathing the bottom of vessels. The United States is now the largest producer of copper. The richest mine in the world is at Calumet, Michigan, on Lake Superior. Arizona, Montana, Utah and other parts of the Union also produce copper. The world's production of copper, in 1906, was 715,268 tons, the chief countries producing the metal, besides the United States, being Chile, Japan, Mexico, Australasia, Spain, Portugal, Germany and South Africa.

Copperfield, David, published in 1850, is perhaps the greatest of the works that have come from the pen of Charles Dickens. This book gives a picture, on the one hand, of a charming candor and honesty and, on the other hand, of the misery and desolation that may be wrought by evil. In many ways *David Copperfield* is an account of the experience of Dickens himself, at least as regards his childhood and youth. The hardships, the loneliness, the uninviting tasks and even the debtor's prison were his own. John Dickens and Mrs. Dickens seem to have furnished him with models for the Micawbers; and their house in Gower Street, London, was too often the scene of real sieges by angry "duns." But the book itself has all the interest of a great novel. Readers of *David Copperfield* never utterly forget the impression of the happy home at Norfolk, the second marriage of David's mother and the difference which it makes for the child, the steady toil in the London warehouse, the loves of David with Dora and Agnes and the darker pictures of the betrayal of Emily and the villainy of Uriah Heep, whose schemes are in the end defeated by Micawber.

Copperhead. (*Ancistrodon Contortrix*) This venomous snake belongs to the rattlesnake family, but it has no rattle and gives no warning of its attack. Its head is the color of burnished copper, its body is brown or sometimes golden, with dark blotches, Y-shaped on the sides and round on the belly. It grows to over four feet in length, and is as venomous as any of our snakes. But the stories told of its ferocity in attack are probably untrue. It is sluggish, and the chief danger is lest, in picking up some object on the ground or in putting one's hand in the brush, one should touch it. In winter it sleeps in a ground-hole or den; from spring to autumn it seeks damp places, especially among rocky hills. In midsummer the young are born, alive. Its favorite food is field-mice. It is common among the hills that border the Hudson and Connecticut valleys; but it is also found from Massachusetts to Texas, though frequently called by such names as pilot, red-eye, red adder and copper-belly.

Copts, the Christian descendants of the old Egyptians. There were 609,511 of them in 1897, forming one twelfth of the population of Egypt. Most of them live in Cairo, but there are a number in Upper Egypt. They make good clerks and handicraftsmen. They are of middle height, with black eyes and curly hair. They dress like the Mohammedans; but can be told by their black or blue turbans. They are, as a rule, a morose people, but are the best educated and most intelligent of the native Egyptians. St. Mark is said to have made them Christians. The head of the church is the patriarch of Alexandria; they have bishops, monks and priests, the priests being allowed to marry before they take their vows; the patriarch does not marry, and when he sleeps he must be awakened every quarter of an hour. Wednesday and Friday are fast days, and the fast of Nineveh lasts nearly two months. The Coptic language goes back to the old Egyptian; the boys learn to read it at school, but Arabic is everywhere spoken. The United Presbyterians from the United

States have for 50 years had wonderful success with them.

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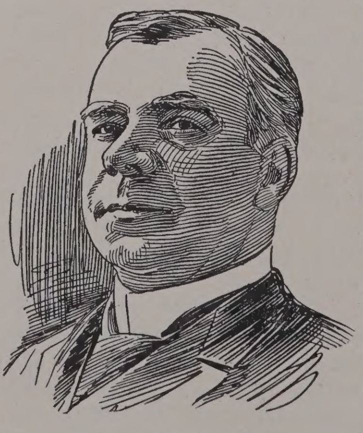
No copyright is valid, unless notice is given by inserting in every copy published, on the title-page or back thereof if it be a book; or if a map, chart, musical composition, cut, print, engraving, photograph, painting, drawing, chromo, statue, statuary or model or design intended to be perfected as a work of the fine arts, by inscribing upon some portion thereof, or on the substance on which the same is mounted, — the following: *Entered according to Act of Congress in the year—, by ——, in the office of the Librarian of Congress, at Washington,* or, at the option of the person entering the copyright, the words: *Copyright,* 19—, *by* ——. The copyright law of the United States secures to authors and their assigns the exclusive right to translate or to dramatize any of their works; no notice is required to enforce this right.

International copyright was secured in the United States by a bill in Congress, passed in March, 1891, which took effect in the following July. This act is known as the Chase bill. It gives foreign authors a copyright in the United States of America when the book or production is from type set, or from negatives or drawings on stone made, within the United States. Musical compositions are exempted from the second condition. The act, however, applies to the work or production of a citizen or subject of a foreign state or nation only when such foreign state or nation permits to citizens of the United States of America the benefit of copyright on substantially the same basis as its own citizens, or when such foreign state or nation is party to an international agreement which provides for reciprocity in the granting of copyright, by the terms of which the United States of America may, at its pleasure, become a party to such an agreement. The United States has entered into agreements of reciprocal copyright with Belgium, Denmark, France, Germany, Great Britain and her possessions, Italy, Portugal Spain and Switzerland. An American may secure copyright in Belgium by registering his work at the Department of Agriculture, Industry and Public Works in Brussels. In France it is given upon the deposit of two copies of the work with the Minister of the Interior at Paris; in Switzerland, by the registration of the work at Berne in the Department of Commerce and Industry, with a copy to be there deposited, accompanied by a fee of two francs.

Coquelin (*kôk-lăn′*), **Benoit Constant,** a noted French comedian and, with his brother, also an actor, a writer on stage-art, was born in 1841 at Boulogne, and educated at the Paris Conservatoire. He first appeared at the Théâtre Français in 1860, and has met with great success in France, England and the United States in the representation of classic French comedy. His chief successes have been won in *Le Marriage de Figaro; La Malade Imagi*



M. COQUELIN

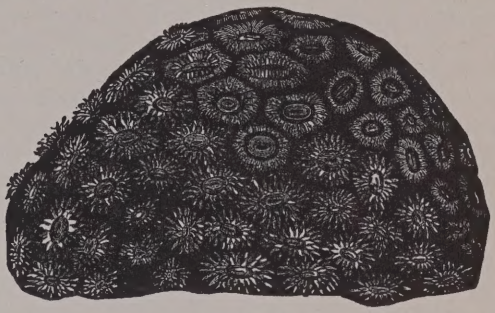
naire; Fourberies de Scapin; Le Lion Amoureux; and *Cyrano de Bergerac*. He died Jan. 27, 1909. His son, Jean (Coquelin *fils*), born in 1865; made his first appearance on the stage in 1890, and has, with great acceptance, filled many of his father's famous rôles.

Coral, the skeleton of sea-animals called polyps, constructed like the sea-anemone. The coral is formed within the fleshy part of the animals, without effort on their part, as bones grow in the body. Each polyp consists of a tubular body, fixed at one end. The other end is surmounted by a disc, in the center of which is a mouth, and the disc is surrounded by tentacles. The coral substance is carbonate of lime, and is laid down within the walls of the tubular body, and within membranous partitions reaching from the body-wall to the stomach-wall. It is formed in the lower part of the animal, leaving the upper part soft and flexible, and capable of being drawn in and expanded.

CORAL

The coral-producing animals are sometimes solitary, but, more frequently, occur as colonies of many individuals, united together by a common branching stalk, so that the whole colony is shrub-like. Their general resemblance to plants is so great, that at one time they were called plant-animals. At intervals, along the trunk and branches of the shrub-like colony, are found the individual polyps. These are all connected by an expanse of living matter. The polyps take food from the water into the mouth-cavity, which leads at once into the tubular stomach, and the arrangement is such that the tubular canals of different individuals communicate, making it possible for the food to be carried from one part to another throughout the colony. Coral that is formed within a colony of this description is of the branching kind. (See illustration.) The limy substance is not only laid down in parts of the polyps, but in the expanse of living matter joining them together, and, therefore, the formation is continuous and assumes the general form of the colony. In the illustration the position of the polyps can be seen as small tubular elevations. There is great variety as to the size of different kinds of polyps. The illustration shows the common branching coral (*Madrepora*) of the Florida coast, in which the polyps are small. The colonies are not always of the branching form; some are in the shape of large rounded masses, with the polyps arranged in rows or furrows, as in the brain-coral and the star-coral. (See illustration.) These masses grow to be from one to three feet in diameter.

Besides living corals there are many fossil forms. Among the commonest are those stony masses, often called petrified honeycomb and petrified wasp's nests, to be found on beaches, in fields and imbedded in rocks. The honeycomb-shaped masses, especially, are polished and known locally as Mackinac stones. They are used as paper-weights and, to some extent, in jewelry. There also are chain-corals and the single horn-shaped corals.



CORAL

Red coral is of a different kind. Although the colony which forms it is tree-like and the individual polyps have long tubular bodies, the coral substance is laid down in the base of the polyps—not in their body-walls—and, also, in the sheet-like expanse of living material that unites them. As a consequence, the product is smooth and not marked by elevations. The ordinary red coral used in necklaces and scarf-pins is not expensive, costing from one to one and a half dollars an ounce; but large pieces of the approved rose-tint, which are rare, bring several hundred dollars an ounce. In addition to the kinds mentioned, there are others, known as sea-fans, sea-plumes, etc. The stalk secreted is horny or limy, and, in the sea-fans, is a broad, thin expanse of reddish or yellowish material, formed into a fine network, with thickened veins running through it like the veins in a leaf. These are related to the red corals. The corals are one branch of a subkingdom of animals (*Cœlenterata*) that embraces jellyfish, hydroids and fresh-water hydra.

The extent of coral-formations in tropical seas is remarkable. These animals thrive only in warm (68° Fahr. and above), clear water, and not below a hundred and twenty feet in depth. From that depth to the surface they live readily and form reefs. The great barrier reef (coral) of the northeastern coast of Australia stretches, with some interruptions, a thousand miles along the coast, and is in places from one to three miles wide and from twenty to sixty miles from the mainland. Some islands are entirely composed of coral-formations, and the everglades of Florida and the keys south of it are mainly coral-formations. There also are *atolls* or circular coral-reefs in mid-ocean, and, although their method of formation is now under dispute, the old explanation meets the requirement in some cases. It is supposed that they were originally built upon the sloping sides of a volcanic island and that, by very gradual sinking, the island disappeared below the water, leaving a central lagoon. The coral-animals, in the meantime, built toward the surface and kept pace with the subsidence. See Dana: *Corals and Coral Islands;* Darwin: *Structure of Coral Reefs;* Verrill in *American Naturalist*, Vol. II., p. 351.

Corday, Charlotte. See MARAT.

Cor'dova or **Cor'doba,** a city in Spain, on Guadalquivir River. Its old walls are surmounted by turrets, shut-in gardens, vineyards and narrow streets. Its cathedral was built as a Moorish mosque in the 8th century, and is the finest Mohammedan temple in Europe. Cordova was founded by the Romans in 132 B. C.; was captured by the Goths, and then by the Moors. From the 9th to the end of the 12th century it was one of the leading Moorish cities, famed for its mosque, palaces and great university. Cordova is also a province of Spain, with an area of 5,299 square miles and a population of 455,859. Its chief product is coal. Population of the town, (1900) 58,275.

Coréa. See KORÉA.

Corelli, Marie, a notable and prolific English novelist, the adopted daughter of the Scottish song-writer, the late Charles Mackay, was born of Italian parents and educated partly in England and partly in a convent in France. She was designed at first for a musical career; but early in the eighties she abandoned this for literature, making a marked success as a writer of fiction. It is said that a curious psychical experience, occurring to herself personally, suggested the theme of her first novel, which appeared in 1886,—*A Romance of Two Worlds.* This work, together with her novels, *Barabbas* and *The Mighty Atom*, met with a phenomenal sale, and all have been translated into most of the languages of Europe, as well as into Persian and Hindustani. Hardly less successful have been her other stories: *The Sorrows of Satan; The Soul of Lilith; Thelma; Wormwood; Ardath; The Murder of Delicia; The Master Christian.* Died 1924, aged 60.

Corfu (*kŏr-fōō'*), the largest of the Ionian Islands, the possession of Greece, lies at the entrance of the Adriatic Sea. It is 40 miles long and two and a half wide. The island is mountainous, the highest point being Pantocrator, 2,997 feet above the sea. The main export is olive-oil. Corfu was first named Corcyra, and was a colony of Corinth. It became so powerful that it fought with the mother-country the first sea-battle of which we know, in 665 B. C. Area 431 square miles; population (1896), 150,000. Population of the town of Corfu, 30,000.

Cor'inth, called the Star of Greece, lies on the Isthmus of Corinth, under the northern slope of the mountain, forming one of the strongest fortifications in the world, on which stood its citadel. With Argolis, Corinth forms a portion of the kingdom of Hellas, adjoining the isthmus that connects the Peloponnesus with Attica and the mainland. Its area is 1,442 square miles and the population of the province is about 170,000. The city has three harbors, and its position midway between the Ægean and Adriatic Seas made it a trade center. It was much easier to carry goods across the narrow isthmus than to sail around the Peloponnesus, and so in its western harbor lay ships from Italy, Sicily and Spain, while its two eastern harbors trafficked in the merchandise of Egypt, Syria, Phrygia and even India. Corinth itself exported chiefly statues, pictures, vases and bronze and earthenware vessels. Corinth built the first triremes or galleys, which, rowed by its numberless slaves, sailed everywhere, founding a dozen or more great colonies of the mother-country, the largest being Syracuse. We are told that Corinth was founded in 1350 B. C. by Sisyphus, an Æolian. Later, it was conquered by the Dorians. Sometimes it was under a king; at others under an oligarchy or the rule of the few. Its foremost king was Periander, who fostered the city's growth; the greatest patriot was Timoleon, whose love of his native city made him overthrow and slay his own brother, the tyrant, Timophanes, who had made himself master of Corinth. Corinth was the first city to become jealous of the rising power of Athens after the Persian War, and incited the other states to begin the great Peloponnesian War. Later, it waged the Corinthian War with Athens, Thebes and Argos against Sparta. Here Alexander was named the leader of the Greeks against Persia. In 146 B. C. the Romans razed Corinth to the ground. Just a hundred years later Julius Cæsar rebuilt it, and it soon became again a great trading-center. St. Paul lived here a year and a half, founded a Christian church and afterward wrote to the Corinthians two of his letters. Here also were held the famous

Isthmian games. The gods of the sea and of love especially were worshiped; it was the most vicious city of Greece, noted for its luxury and art. Later, Corinth was overrun by Alaric, the Slavs, Franks, Turks, Venetians and Turks again. When freed from the sultan in 1822, it had a steady growth until 1858, when it was devastated by an earthquake. It has since been rebuilt, three miles northeast of the old site and near the western mouth of the canal that has been cut through the isthmus. The population of Corinth at the height of its fame was about 300,000; population of the commune (Gortho) to-day is about 12.000.

Corinth, a town in Alcorn County, Miss. It is a railroad-junction, and so was of great importance during the Civil War. On Oct. 3, 1862, it was held by a Union force of 53,000 under General Rosecrans, and firmly intrenched. The Confederates, 40,000 strong, under Generals Price and Van Dorn, tried to carry the works by storm, but were repulsed and pursued with heavy loss. The Federal loss was 2,502; that of the Confederates, 3,117. The population of Corinth according to the last census, is 5,020.

Corinth, Gulf of. See LEPANTO.

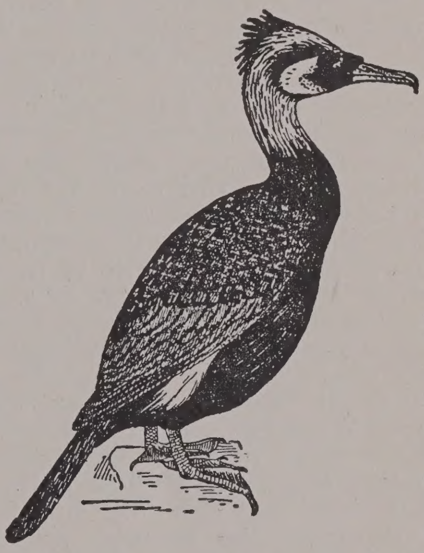
Coriolanus (*kō-rĭ-ō-lā′nŭs*), **Gaius Marcius,** so called from his bravery at the taking of Corioli, a Volscian town, in 493 B. C. He was a Roman patrician, and so opposed the plebeians or common people. The people refused to choose him consul, and in return he made a speech in the senate against a free distribution of wheat to the citizens, which had just come from Sicily. Thereupon he was banished; but soon, at the head of the powerful Volscians, he won victory after victory, and now swooped down upon Rome. In vain did the leading men go to his camp to dissuade him from attacking the city. At last the noblest women of Rome, headed by Coriolanus's aged mother and his wife leading his two sons, came to his tent. His wish for vengeance could not withstand their tears, and he led the Volscians back to their own country. Shakespeare founded his *Coriolanus* on this story, as related in North's *Plutarch.*

Cork, a tissue usually formed in the outer part of the cortex of perennial plants. The tissue is characterized by the fact that the cells are flat, with no spaces between them, and the walls are water-proof. Cork is the most prominent part of bark, and the commercial supply is obtained from the bark of a species of oak, *Quercus Ilex* (often called *Q. suber*). Forests of cork-oak are cultivated in southwestern Europe.

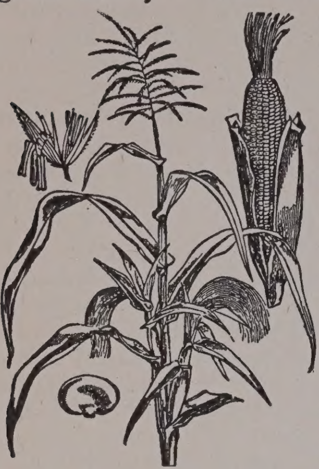
Cork (meaning swamp), a city of Ireland, is situated on the River Lee, in a pretty valley, built partly on a group of little islands, joined by nine bridges to the rest of the town, which is built on the riverbanks. Its race-course park and Mardyke, a shaded walk a mile long, are its chief features. The cathedral, St. Ann de Shandon's church and Queen's College, founded in 1849, are the main buildings. The city owes its growth to the facilities afforded by Cork harbor, a basin ten miles square. It is guarded by batteries, with three forts fitted with the heaviest guns. On the banks of the Lee are also four miles of wharves. Cork is a busy manufacturing and exporting city. Its port is Queenstown. In 600 an abbey was erected on its site, and the Danes built its walls in the 9th century. It was surrendered by its last king Dermod MacCarthy, to Henry II in 1172. Cork also is a county in the province of Munster, area 2,890 square miles. Population, 391,090. Population (1911) of the city, 76,632.

Corm, a special form of thickened underground stem which resembles a bulb in outline, but has thin scale-leaves upon it, instead of fleshy ones. Indian turnip (from Jack-in-the-pulpit) is a typical corm.

Cormorant, a web-footed bird related to the pelican, that feeds like a glutton on fish, which it catches by swimming and diving. It has a strong, hooked bill, long neck, short wings and a rather long round tail. Its plumage is blackish, but the face is usually naked and brightly colored. It is very widely distributed; some forms live inland by rivers and lakes, others on the seacoast and about islands. Some of the cormorants of the United States live in pairs, but more often in great flocks, flying around vessels at sea in great numbers. They are also called shags. The Chinese breed and train them for fishing. A ring of hemp is tied around the neck to prevent them from swallowing the fish, and, for two or three hours at a time, they will dive and bring up fish in their bills, which are taken into the boat by the fishermen. Fish too large to be managed by one are attacked by two or three birds at a time. In 1898 a very large non-flying cormorant was discovered on one of the Galapagos Islands. The bird is rare.



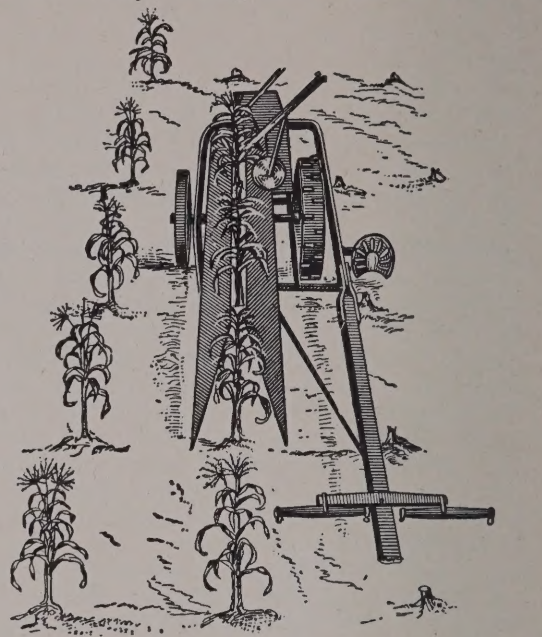
CORMORANT



CORN

Corn, Indian, or **Maize,** the original name of corn or *Zea Mays*, a species of the grass family. Corn is said to have become the most important food-plant, next to rice. It is now almost unanimously conceded that it originated in America and is probably native to Mexico. Corn was found in cultivation by the Indians upon the discovery of America, and has continued to be called Indian corn; in fact the name maize is seldom used in America. Although very numerous varieties have been developed, they are all considered to have been derived from a single species. The commonly used classification is as follows: pod-corns, pop-corns, flint-corns, dent-corns, soft-corns, sweet or sugar-corns, starchy sweet-corns. Sweet corn is distinguished from the ordinary field-varieties by its wrinkled or shiveled kernel and its somewhat translucent appearance. The popcorn is characterized by the excessive development of the horny region of the endosperm and by the very small size of the kernels and ears. Corn is hardly less a staple food than is rice in tropical countries, while in colder countries it is rapidly becoming popular. It is thought to be more nutritious than barley, buckwheat or rye. It is more generally used in America than in other continents. In the United States the annual crop is over 2,700,000,000 bushels, or about two thirds of all the grains grown. When coarsely ground, corn forms hominy; when finely ground, cornmeal. Pop-corn is a variety whose grains, when roasted, swell and burst, turning inside out. However, the greatest use of corn in America, is as a food for cattle, sheep and hogs. Large quantities of starch are made from corn. This is used for food and for laundry-work, while a good part of it is made into grape-sugar or glucose. The dried leaves and stalks of corn furnish a supply of cattle-fodder. The husks are used for packing and for mattresses; while in South America they are also used for cigarettes. The cobs make popular pipe-bowls for tobacco. Corn was introduced into Europe by Columbus; but there is good ground for believing that the maize plant was known in Asia and Africa before that time.

Corn-Harvester. Among the many labor-saving machines which have so greatly aided modern agriculture is that known as the corn-harvester. One type of these machines cuts the corn and binds the stalks in bundles ready for shocking. Another type cuts and shocks the corn without binding it into bundles. With the use of one of these machines a single man with a team may easily cut eight or ten acres of corn in a day, doing the work of four to eight men by former hand-methods. The illustration shows the cutting mechanism of one of these machines. The edges of the side-knives are at an angle to the line of draft, and as the machine advances the knives move with a shear-cut against the corn-stalks, severing them. They are then carried away by a conveyor and bound in bundles.



CUTTING MECHANISM OF CORN-HARVESTER

Corneille (*kôr'nāl'*), **Pierre,** the greatest French tragedian and the founder of French comedy, was born at Rouen, June 6, 1606. His ill-success as a lawyer sent him to Paris in 1629, where his first comedy was produced and acted in two theaters at the same time. In 1636 *The Cid*, his most popular tragedy, took Paris by storm, and in spite of Richelieu, a personal enemy of the author, and in spite also of the Academy, his creature, could not be suppressed; and soon "fine as the Cid" became a common saying. *Le Menteur* showed the author to be great in comedy as well as in tragedy. *Polyeucte* and *Rodogune* are others of his best works; while the finest verses he wrote occur in the central love-scene of *Psyche. Horace* and *Cinna* are also favorite productions of Corneille. Strength and sublimity are his chief characteristics.

Corne'lia. See GRACCHI.

Corne'lius, Peter von, one of the first masters of the modern German school of painting, was born at Düsseldorf, Sept. 23, 1783. When but 19 years old, he painted some fine frescoes in an old church. In Munich he painted his greatest works—a series of frescoes based on the stories of the Greek gods and heroes, and another series of New Testament scenes from the Incarnation to the Judgment, the latter being the largest fresco in the world. He achieved fame also by his *Four Riders of the Apocalypse*, painted in Berlin. More important than his paintings, perhaps, was the impetus he gave to wall-decoration. He died at Berlin March 6, 1867.

Cornell, Ezra, American philanthropist and founder of Cornell University, was born at Westchester Landing, N. Y., Jan. 11, 1807, and died at Ithaca, N. Y., Dec. 9, 1874. He settled in Ithaca as a mechanic and miller in 1828, and early took an active part in the construction of telegraph lines, in which, and in connection with the Western Union Telegraph Co., of which he was the founder, he amassed a fortune. Early in the sixties he was a member of the state assembly, and later was elected to the state senate. In 1865 he gave half a million dollars, afterward much augmented, to found the university at Ithaca, N. Y., which bears his name, and to which Congress made an appropriation of land. The institution opened in 1868.

Cornell University, is located on Cayuga Lake, at Ithaca, N. Y. It was chartered in 1865 and 1867, and with ample endowment, including the income from a grant of nearly a million acres of land, it rapidly took rank with the first educational institutions of the country. It was named after Ezra Cornell, who gave a large sum toward its endowment, and whose able management was largely instrumental in placing the institution on a sound financial basis. Besides the academic department it has Colleges of Law, Medicine, Agriculture, Veterinary Medicine, Architecture, Civil and Mechanical Engineering. The teachers number 750, and the students 6,891.

Cor'net, a musical instrument, usually of brass and originally curved like a horn. The best form is known as the cornet-à-pistons, because changes of sound are made by manipulating pistons with the fingers. It has a compass of two octaves and two notes. It is not an instrument of especially fine or delicate sound; but in orchestras, in company with other instruments, its effect is excellent.

Corn'ing, N. Y., a growing town in western central New York, one of the capitals of Steuben County, 17 miles west of Elmira. It is situated on the Chemung River, and has a number of factories, including railroad-car-shops, brick and terra-cotta works. The leading industry, glassware manufacture, employs upwards of 2,000 people. It has good educational facilities and an active civic life. It has the service of three railroads. Population, 16,000

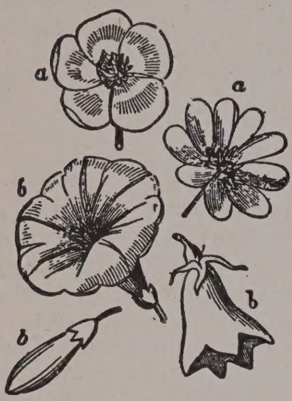
Corn'planter, a half-breed Seneca Indian and chief of the Six Nations. He was born about 1732, and was the son of John Abeel, a white trader. He fought the English at Braddock's defeat, and was a deadly foe to the colonists during the Revolutionary War; but afterward became a steady friend of the white people. He was an intelligent, dignified and moral man. He died on Feb. 18, 1836. Pennsylvania erected a monument in his honor in 1867.

Cornu (*kôr'nü'*), **Marie-Alfred,** distinguished French physicist, head of the department of physics at the *École Polytechnique*, the great military school of Paris. He was born on March 6, 1841, and was educated at the institution where he later taught. Cornu's investigations cover a large range of optical and acoustical subjects. Among the most important of these may be mentioned his very accurate determination of the speed of light by the method of Fizeau; his determination of the density of the earth by the Cavendish method; his study of the solar spectrum and the ultra-violet spectra of the metals; and his mathematical discussion of the diffraction-grating. Besides being a member of many learned societies, Cornu was a prominent member of the French Academy, and was president of the International Congress of Physicists which met at Paris in 1900. He died in 1902.

Cornwall Canal. This Canadian canal extends past the Long Sault rapids from Cornwall to Dickinson's Landing. From the head of the Soulanges to the foot of the Cornwall Canal there is a stretch through Lake St. Francis of 32¾ miles, which is being made navigable for vessels drawing 14 feet. The length of the canal is eleven miles. It has six locks 270 by 45 feet. The total rise or lockage is 48 feet. The depth of water on the sill is 14 feet. It is 100 feet wide at the bottom and 164 at water surface. See LACHINE and SOULANGES.

Cornwall, county-seat of Dundas, Stormont and Glengarry Counties, Ont., is situated on the north bank of the St. Lawrence River at the foot of the Long Sault rapids, and has a population of 6,704 people, largely engaged in manufacturing. It is on the Grand Trunk and Ottawa & New York railways. Its leading industries are cotton, woolens, paper, machinery and pottery.

Corn'wallis, Charles, Marquis, was born at London, Dec. 31, 1738. He served in the Seven Years' War, and accepted an appointment as major-general in America, though he disliked forcing taxes on the colonists. He was the ablest British general in command, winning the battle of Camden against General Gates, gaining a slight advantage over Greene at Guilford, but being forced to surrender at Yorktown in 1781. He afterward was governor-general of India, where, by his victories over Tippoo Sahib, he probably saved India to the English Made lord-lieutenant of Ireland, he put down the rebellion of 1798, and gained the good-will of the Irish. The ability of Cornwallis in India and in Ireland shows that his failure in America was largely due to the poor generalship of his superior officers, Howe and Clinton. Cornwallis died on Oct. 5, 1805, while on his way to the Indian upper provinces, having been made governor-general a second time.



a, a. Corollas with free petals.
b, b. Corollas with petals united.

Coroľla (in plants), the inner set of the two floral envelopes, which usually forms the showy part of the flower. The individual parts are called petals. See FLOWER.

Coronado (*dă̇ kō'rŏ̇ nä'thŏ̇*), **Francisco de,** a Spaniard, born in Salamanca probably about A. D. 1510, was the leader of a pioneer force of troops which, starting from Mexico, did much to explore the unknown region which now is the southwest portion of the United States. The expedition appears to have advanced as far as what now is Kansas. Coronado saw the possibilities of the land which he visited for agriculture; but he was disappointed in his search for precious metals. His papers give the first reliable account of the American bison or buffalo. The latter part of the life of Coronado was spent in retirement, and the date of his death is uncertain. For the papers of this expedition see *The Coronado Expedition* (Winship) in *Reports of the U. S. Bureau of Ethnology, No* 14.

Corot (*kŏ̇'rŏ̇'*), **Jean Baptiste Camille,** a French landscape-painter, was born at Paris, July 28, 1796. He was first a clerk in a dry-goods store, but his tastes led him early to study art. His paintings made their way slowly, but wealth and fame finally came to him. Corot's landscapes were true copies of nature. His favorite subjects were misty lakes, rivers smothered in vapor and the quiet of moonlight or sunrise, which he painted as a poet would have written of them. He had great influence on young French artists, who admired and liked him for his genius, kindliness and generosity. At one time they gave him a medal of their own when the Salon had passed him by, and they always called him Father Corot. Among his masterpieces are *The Dance of Nymphs* and *Macbeth.* He died on Feb. 22, 1875.

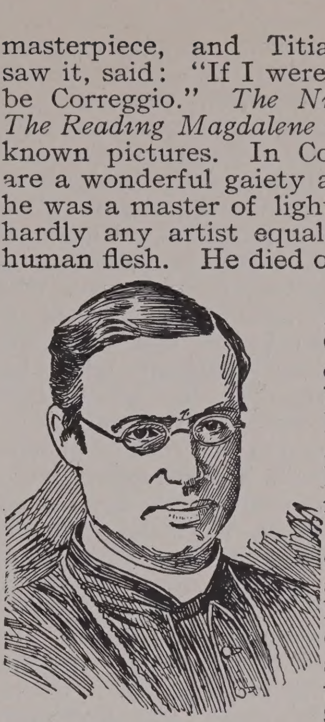
Corporations. Corporations were known to the laws of ancient Rome; but it is only of late, and especially in the United States, that their value as an instrument of commerce as well as their danger to the public welfare has been fully realized. We seem to be in a fair way to preserve the use and to prevent the great abuse of corporate power. A corporation is distinguished from the ordinary partnership in that it is, in the eyes of the law, a distinct *person*, created by the act of incorporation. It continues, though all the original shareholders have died, its acts are to be considered quite distinct from those of the shareholders, it may sue or be sued in the courts. In one sense it is even a citizen, for it has in general the privileges guaranteed by the constitution of appealing to the supreme court against any state action which the constitution forbids. But this citizenship it does not possess in one matter. It cannot claim the right to do business in any state under the same conditions as those that govern citizens of that state. Thus Texas may pass one set of laws for corporations incorporated within its limits, and another for all other corporations, and forbid their entrance to the state on any other conditions. However, by the interstate commerce provision of the constitution, the products of a corporation of another state may not be excluded from any state, except under conditions that apply to all persons alike. A partnership, on the contrary, is not a distinct person, and the several members are liable to suit for the actions of their partners in whatever business they have agreed to be partners. A joint-stock company, in like manner, is not a separate person, and the members are liable to be sued for its acts, though they are not held to be responsible for all the acts of the company's officers as a partner is responsible for his partner's acts.

At present the Federal government does not incorporate; that is left to the several states. In some states every corporation must be established by a special act of the legislature; but it is now common to lay down by statute the conditions of incorporation and then, whenever those conditions have been fulfilled, the corporation is by that fact established. The act of incorporation has been held by the supreme court to be a contract between the state and the corporation, and it cannot therefore be broken. The state must therefore arrange for the control that it desires to exercise over corporations, before the corporation comes into existence. It is here that we have failed. New Jersey, above all other states, offered exceptionally favorable terms to corporations if they would incorporate under her laws, so as to give her the benefit of the taxes that might be imposed on them. New York was compelled to follow suit, in part, for the same purpose. Other states have joined in this attempt to offer favorable terms with the result that proper provisions for control have not been inserted. The failure to insert proper provisions when incorporating many of the railroads has been especially injurious. It is largely as a result of these mistakes of the state governments, and also because of their inability to agree upon a single line of action toward corporations, that the Federal government has been obliged to take action in the matter. Practically all great trading corporations deal in interstate commerce, and Congress has control over such commerce and thus, indirectly, over such corporations. It has been *proposed* that all corporations that have interstate commerce be required to receive incorporation from the Federal government.

Corporations may be divided into sole and aggregate. A sole corporation exists where, for example, the Secretary of War in England *with his successors* is a corporation. Most corporations have many members and are *aggregate.* These are divided into public and private corporations, of which the former include, for example, cities and villages, which are conducted by the public for the public good. There also are eleemosynary corporations which are run by *private* individuals for the public good, as colleges, churches. The savings-banks in like manner are eleemosynary.

Corpus Christi, Texas, a city and county-seat of Nueces County, 149 miles from San Antonio. It is located at the mouth of the Nueces River, on Nueces and Corpus Christi Bays. It is the trading-center of a fine agricultural and stock-raising region, and its fish-packing business is very large. The city has good public schools, a convent, several churches, etc. It is served by four railroads, and has a regular freight steamer service with New Orleans. Population at the present time is 20,000.

Correggio (*kŏr-rĕd'jō*), **Antonio Allegri da,** was named from his birthplace, Correggio, near Modena, Italy. He was born in 1494, and, as his father was well-off and his uncle an artist, Antonio seems to have had none of those struggles with poverty that have hampered so many painters. In 1518 he painted a salon in the convent of San Paolo in Parma. The groups of goddesses, graces and nymphs were painted with a fullness of life, gaiety and grace, at that time unknown, that at once stamped him as a genius. In 1522 he began his famous decoration of Parma's cathedral, painting in the main dome his *Assumption of the Virgin*—the Madonna borne up to heaven by a countless throng of rejoicing angels, while the Savior descends to meet her. This is deemed the painter's masterpiece, and Titian, when he first saw it, said: "If I were not Titian, I would be Correggio." *The Night*, *Il Giorno* and *The Reading Magdalene* are among his best-known pictures. In Correggio's art there are a wonderful gaiety and a sunny charm; he was a master of light and shadow; and hardly any artist equaled him in painting human flesh. He died on March 5, 1534.



ARCHBISHOP CORRIGAN

Cor'rigan, Michael Augustine, Roman Catholic archbishop of New York, was born at Newark, N. J., Aug. 13, 1839, and educated at St. Mary's College, Wilmington, Del. In 1863 he was ordained to the priesthood at Rome, and, after holding the chair of dogmatic theology and subsequently the presidency in Seton Hall College, Orange, N. J., he was appointed by Pope Pius IX to the see of Newark in 1873. Seven years later he became coadjutor to Cardinal McCloskey, and, on the death of the latter, was made metropolitan of the diocese of New York in 1885. He died on May 5th, 1902.

Correlation of Studies. In modern methods of teaching the attempt is made to relate together those portions of the subject-matter of the curriculum which appeal to the same human interest. Thus it is evidently better, other things being equal, to teach the history and geography of a country in close connection with each other, rather than independently. The principle of relating portions of the curriculum to each other or to a common interest is called the correlation of studies. Correlation is one of the practical recommendations of the school of Herbart. Froebel also related the activities of the child as far as possible to a central object; but correlation is not the same conception for Froebel as for Herbart. For Herbart, correlation is based upon a theory of association of ideas in the individual mind. For, in order that the life of thought may possess unity and harmony, it seemed to Herbart that ideas should be associated according to a process to be directed by the teacher from without. In other words, instruction needs to be a deliberate endeavor to organize the pupil's ideas, and not merely to present them to him; since otherwise the house of thought and, hence, of will might be so divided against itself that it could not stand. But to Froebel, correlation appears to indicate just the recognition of the fundamental oneness of the individual with society. Correlation is for him the process of carrying over the inward unity of the self to the field of its manifestation or liberation. According to this view, which has been expounded by Professor Dewey, the correlation of studies is not so much a process of relating them to each other as of relating them to life and to its needs and purposes. The child or the student will correlate subjects for himself. This, however, is no reason why the teacher should not assist him in so doing, as Herbart advised. The child will correlate his manual training with his geography more readily, if the teacher shows him on the map from what countries and by what routes the various species of woods which he uses are brought.

Special types of correlation are those known as *concentration*, in which the attempt is made to relate all the curriculum to one topic, and *co-ordination*, in which the subjects of the curriculum are arranged in several groups. As an example of the first type Ziller would make all the instruction of a pupil for one year to be grouped about the story of Robinson Crusoe. As an example of the second type Dr. Harris would subdivide the curriculum into five groups of equal value, so that the subjects in each group should be closely interrelated.

See *Report of Committee of Fifteen* of National Educational Association; also books of the Herbart Society.

Correspondence-Schools. The first regularly organized correspondence-courses appear to have been given by the Chautauqua Circles about 1880. Since that time this means of education has been adopted to a considerable extent by a number of colleges and universities, and by receiving credit for work thus done, many worthy students are enabled to earn university degrees who would otherwise be unable to do so. The University of Chicago offers a very large number and variety of correspondence-courses.

The greatest development of this method of instruction has been in the hands of private schools devoting their whole attention to the work. They send out instruction-papers especially designed for home-instruction. They require written answers to questions upon the work as soon as it has been mastered by the student, and these answers are sent to the instructor, corrected by him, and returned to the student. The instruction in most cases is satisfactory. It cannot be denied, however, that the successful pursuit of this method of study requires more than average perseverance on the part of the student. Many give up their courses before they are completed. It seems advisable in most cases to have the work divided into courses which can be completed in a comparatively short time and to require a course to be finished within a specified time, in order to furnish a stimulus to regular systematic work.

Some of the schools have advertised largely and gathered in students' fees, which were incompetent to give in return anything more than nominal service. Students intending to enroll in correspondence-courses should be on their guard against inferior or fraudulent schools of this kind. See CONTINUATION-SCHOOLS.

Corsica (*kôr'sĭ-kȧ*), an island and department of France in the Mediterranean, lying due south of Genoa and separated from Sardinia by the Strait of Bonifacio. Corsica (Corse in French, from the Greek *Cyrnus*) was the birthplace of Napoleon Bonaparte. Its surface is mountainous, and the island was long noted for its vendettas and brigands. Its products besides timber, include oranges, lemons and grapes,—the chief exports being wine and olive-oil. It has an area of 3,367 square miles; its length is 114 miles, and its breadth 52 miles. The capital is Ajaccio on the west coast; but the chief town is Bastia on the northeast portion of the island. The population, which speaks Italian mainly, is about 295,589. The island was acquired by the Romans at the close of the first Punic War, and was for periods held by Vandals, Goths, Franks, Saracens, Pisans and Genoese. France acquired it in 1768, but in 1793 it came for awhile under British rule; though three years later it was regained by France, which today maintains a torpedo-station on the island.

Cor'sica'na, Texas., the county seat of Navarro County, on St. Louis Southwestern, Trinity & Brazos Valley and Houston & Texas Central Railroads, 50 miles south-southeast of Dallas and 162 miles northeast of Austin. It has an Odd Fellows widows and orphans' home and a state orphan-asylum. Among its industries, besides planing, flour cotton and cottonseed-oil mills, are foundry and machine-shops, brick-yards and a grain-elevator. Population, 15,240.

Cortelyou, George Bruce. Born July 26, 1862, in New York; was educated in the schools of Hempstead, L. I. and in the Institute and state Normal School, Westfield, Mass. He was a law-reporter in New York City for a time, and from 1885 to 1889 he taught school in that city. He entered public service as a private secretary in 1889, and in 1895 was appointed stenographer to President Cleveland. He acted as private secretary to President McKinley and President Roosevelt; and, when the Department of Commerce and Labor was organized in 1903, he was appointed secretary of that department. In 1905 he became Postmaster-General, and in 1907 he was appointed Secretary of the Treasury. During the presidential campaign of 1904

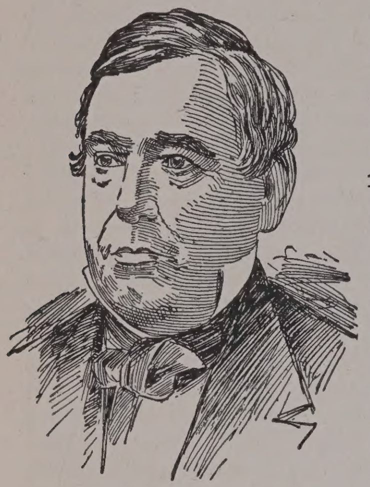
Mr. Cortelyou was chairman of the Republican National Committee.

Cortes (*kôr'tēz*), **Hernando,** the conqueror of Mexico, was born in Medellin, Spain, in 1485. At 19 his longing for adventure sent him on a voyage to San Domingo, and soon after he joined Velasquez in the conquest of Cuba. Alvarado's glowing description of Mexico induced Velasquez to place Cortés at the head of a new expedition. On Nov. 18, 1518, Cortés sailed on one of the most daring adventures of history. He had 550 Spaniards, two or three hundred Indians, twelve or fifteen horses, ten brass guns and a few small cannon. At Trinidad he was astounded by orders from Velasquez to give up the command. Cortés refused to do this, and so cut himself from all hope, save in success. Landing, he fought his first battle at Tobasco, where he captured the beautiful and faithful Donna Marina, who became his interpreter. Soon messengers came from the king, Moctezuma, bringing rich presents but forbidding him to visit the capital. Here some of his men, who were friendly to Velasquez, wanted to turn back, but, taking them into his confidence, the commander told them that conquest, not mere trade, was what he was after, and so won them over. Founding Vera Cruz and burning his ships behind him, he marched to Tlascala, and after hard fighting subdued the country. Soon after, with some thousands of Tlascalans, now his allies, he set set out for Mexico. On Nov. 8, 1519, Cortés reached the capital, which seemed to the Spaniards like a dream or an enchanted castle. They saw before them a city of 300,000 people, in the middle of a great salt lake, approached by three causeways of solid masonry, from three to six miles long, with many wooden drawbridges. He had hardly been a week in the city, when, on the ground that Vera Cruz had been attacked, Moctezuma was carried to the Spanish quarters and put in irons. At first the Mexicans were stricken with fear of these strange men, with horses and cannon; but they soon saw that they were only men after all, and very few at that; so when Moctezuma had been imprisoned some five months, he begged the Spaniards to leave. Cortés asked for time, and learning that 18 ships had landed, sent by Velasquez, he left Alvarado in command, and with a handful of men set out for the coast. At Cholula, by a night-attack in a blinding storm, he defeated 800 fresh Spaniards, who gladly joined his troops. Two weeks later came the news that the Spanish quarter was besieged. On reaching the city, Cortés found himself face to face with the whole nation, led by Moctezuma's brother. After driving back with difficulty a fierce attack, he saw that he must leave the city. At midnight began the retreat over the causeway. Its three bridges had been destroyed by the Mexicans; the first was crossed by a pontoon, but at once the lake was covered with canoes, and so hot was the attack that at the second bridge the pontoon could not be raised. Soon the water was choked with struggling horses and men, and the retreat became a hopeless rout. Out of that fearful night a handful escaped to land, only to find themselves surrounded by a countless host. Yet they cut their way through, every man fighting as ten men would fight, and reached their friends, the Tlascalans. Six months later Cortés, with 10,000 Tlascalans, marched on Mexico again. Brigantines were built, attacks along the causeway were made and a regular siege begun; 50,000 Mexicans died from famine and pestilence; yet the city had to be destroyed before it was taken. At last it fell, after 75 days' siege, which for bravery ranks with any in the annals of war. The Spaniards entered, but found only ruined houses filled with heaps of dead. In 1528 Cortés visited Spain and was highly honored, but, though appointed captain-general, he was not made governor of New Spain, as Mexico was now called. The next ten years he was forced to stand by and see another's bungling government of the rich empire he had won. Meanwhile he discovered Lower California (1533). Disappointed, poor and in ill-health, he went back to Spain in 1540. He accompanied Charles V on his disastrous Algerian expedition, and, touched to the heart by the emperor's refusal to allow him to capture Algiers, answered: "I am a man who has given you more provinces than your ancestors left you cities." Cortés was no common adventurer, but a captain of great military genius and, withal, a statesman of deep foresight. He was cruel sometimes, and passionate, but patient, religious, simple in life, and worshiped by his soldiers and Indian allies. He died near Seville, Dec. 2, 1547.

Cor'tex (in plants). The tissues of stems and roots are arranged in three general regions. In the center is the woody cylinder, sometimes solid and sometimes containing a pith. Outside of the woody cylinder is the region of the cortex, containing the active cells; and about the cortex is the epidermis. In perennial plants, where bark is formed, the cork is developed in the cortex, and the epidermis disappears.

Cort'land, N. Y., a city, the county seat of Cortland County, on the Delaware, Lackawanna & Western and Lehigh Valley railroads, 35 miles south of Syracuse. Settled in the latter part of the 18th century, the city was in 1829 set off as Cortlandville. It has a state normal school and other educational institutions, together with the Hatch Public Library. Its manufactures embrace carriage and wagon-shops, door and window-screen factories, besides wire and wire-cloth, wall-paper, drop-forgings and carriage-trimmings establishments. It is a shipping point also for agricultural and dairy produce. Population, 15,000

Cor'win, Thomas, was born in Bourbon Co., Ky. in 1794, but was brought up in Ohio. He became a lawyer, and was noted both as a speaker at the bar and for his keenness in sifting and massing evidence. He was chosen state representative, member of Congress and later, senator, acting with the Whigs. He was opposed to the Mexican War as unjust. He was elected governor of Ohio after a thorough canvass, speaking in every county and delivering a brilliant speech in support of General Harrison, then Whig candidate for president. In 1850 he became secretary of the treasury under Fillmore. A member of Congress again, in 1858, and supporter of Lincoln in 1860, he was in favor of a compromise on the slavery question, which, he hoped, would avoid war. He became minister to Mexico in 1861, and died at Washington, D. C., Dec 18, 1865.


THOMAS CORWIN

Corymb (*kŏr'ĭmb*), a flat-topped flower cluster, in which the pedicels of the flowers are of different lengths, arising from the axis at different levels. The outer flowers bloom first. See INFLORESCENCE.

Coshoc'ton, Ohio, a city, the seat of Coshocton County, on the Muskingum River and on the Pittsburg, Cincinnati, Chicago & St. Louis and Wheeling & Lake Erie railways, about 70 miles east-northeast of Columbus. It was settled early in the last century and incorporated in 1833. Its manufactures include novelty-advertising establishments, wooden-novelty works, machine-shops, glass-factory and other "plants." It has a public library, churches and schools, and owns its own water-works. Population, 12,000

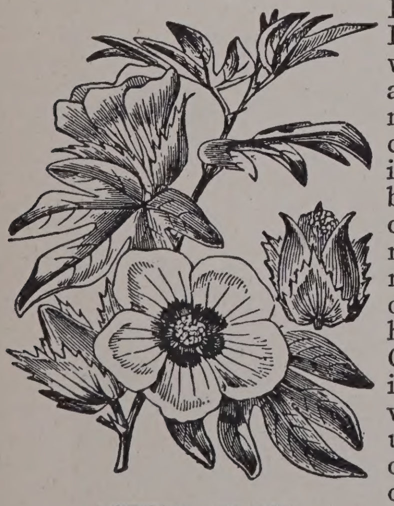
Cos'sacks, a race first known in the 10th century in the region south of Poland and Muscovy. Their name has been said to mean an armed man, a coat, a saber, a goat, etc. Their race-stock is just as uncertain; probably they sprang from mixed Slavonic, Tartar and Circassian tribes, though some hold them to be Tartars, and others almost purely Russians. They fought against the Turks and Tartars, and were very powerful in the 15th century. Poland and Muscovy employed them to guard their boundaries; while Cossacks are to be met with in the outposts of Russia in Siberia, Central Asia and the Caucasus. Sometimes living near hostile peoples, they formed a cordon of settlements along the borders of territory they held; sometimes living in the midst of enemies, they gathered in separate camps, ever ready for attack or defense. They are a democratic people, choosing all their officers for one year only. Every Cossack, too, might be elected to any post, even the highest, that of hetman. There were two branches: the Little Russian and the Don Cossacks. Descendants of the Don Cossacks now form part of the cavalry of the Russian army, and stand fatigue, hunger, thirst and cold with the greatest patience. Though for a long time thought to be fierce savages, late travelers say that in ability, cleanliness and enterprise they are above the average Russians, and in the 18th century an Englishman who had lived with them affirmed that they were "a civilized and very gallant as well as sober people."

Costa Rica (*kos'tȧ rē'kȧ*) (meaning rich coast), a republic of Central America, reaching from the Atlantic to the Pacific, with Nicaragua on the north and Panama on the south. It has an area of 18,400 square miles. Aside from the few Indians, the people are sprung from the Spanish settlers. The country is rich in gold, silver and copper, but its chief trade is in coffee, bananas and bar-gold, and it has been called the Coffee Republic. Costa Rica was discovered by Columbus, and a settlement was founded, probably in 1502, on his fourth voyage. It became free from Spain in 1821, and has had several constitutions, with a president and congress chosen every four years. It is held to be the best governed republic in Central America, though it is in default in meeting the principal and interest of its public debt. Costa Rica has an army of 1,000 men (infantry and artillery) besides 5,000 militia; though on a war-footing the republic can command about 150,000 militia. The state also has one gunboat and one torpedo-boat. In 1909 the value of its exports was $8,176,257; while its imports amounted to $6,109,938. There are 75 post-offices. The railways extend about 300 miles. The bulk of the trade is with the United States the latter supplying Costa Rica with breadstuffs and ironwork. The state-church is Roman Catholic. The capital is San José (population, 26,682). The other chief towns are Cartago, Alajuela, Limon, Puntarenas and Heredia. Population, 351,176 and about 3,500 aborigines.

Cotes, Mrs. Everard (*née* Sara Jeanette Duncan), Canadian and, latterly, an Anglo-Indian, novelist, was born at Brantford, Ontario, in 1861, and educated at its Collegiate Institute. Early in the eighties she began to write for Canadian magazines and to act as staff-correspondent for Toronto and Montreal newspapers. Her cleverness, fine perception of the weaknesses and eccentricities of human nature and her pervasive humor obtained a connection with the English press and the appointment to act for a literary syndicate in making a tour of the world. The result of the tour appeared in *A Social Departure* and subsequently in *An American Girl in London.* Her later works include *The Simple Adventures of a Mem-Sahib; Vernon's Aunt; A Daughter of To-day; His Honor and a Lady; A Voyage of Consolation* and a delightful book on the author's Indian garden. In 1890 she married the editor of a Calcutta newspaper, a scientist, and has since made India her home.

Cotopaxi (*kō'tō-păks'ē*), the highest volcano in the world, is a peak of the Andes, in Ecuador, 33 miles from Quito. The earliest volcanic outburst of which we know took place in 1532 and 1533. Many others have happened since. In 1744 its thunderings could be heard 500 miles away; in 1768 occurred the worst eruption, when ashes were carried 130 miles. The mountain is a perfect snow-crowned cone. Smoke can be seen issuing from the crater, sounds like explosions are sometimes heard, and at night a glow is noticed on the sky above the volcano. There is little lava, but during an outburst flame, smok and great quantities of ashes are thrown out. Cotopaxi was first climbed in 1872 by Wilhelm Reiss, who gives the height of the northwest peak as 19,498 feet and the southwest peak as 19,429 feet. The last eruptions were in 1877.

Cotton. As early as 1500 B. C. the people of India—and by 1200 B. C. the Greeks, Phoenicians and Egyptians—with primitive appliances, were making cotton cloth of a quality which has been surpassed only by the most skillful manufacturers during the last half century. Cotton either in its wild or cultivated state was used at the date of the discovery of America in practically every country within the 40th parallels of north and south latitude, except in what is now the United States.



COTTON PLANT

Cotton is now cultivated in the United States on nearly all kinds of soils, south of latitude 37, artificial fertilizers being used to increase the yield, or hasten ripening on soils not naturally adapted to it.

THE COTTON QUEEN AND HER DRESSES

The plant belongs to the *Malvaceae*, or Mallow family, and is known by the generic name *Gossipium.* It is a perennial, but under cultivation usually becomes an annual or biennial. Culture in the United States is practically confined to two species, the silky, long-staple Sea Island cotton—*G. barbadence*—grown in the lowland coasts and coastal islands of Georgia and South Carolina; and Upland cotton—*G. hirsutum*—which is of two sorts, short cotton and Upland long-staple cotton. The flowers somewhat resemble single holly-hock blooms and continue to form until frost, opening their pale creamy petals one morning in full maturity for insect pollination, fading to pink by noon, dark pink the second day, and by night are shrivelled ready to be pushed off in a few days by the swelling fruit or boll. Bolls vary from almost spherical to long narrow pointed capsules and are divided into 3, 4 or 5 segments. When the bolls split and the fibres fluff into a twisted mass, the cotton is ready for picking.

ON THE PLANTATION

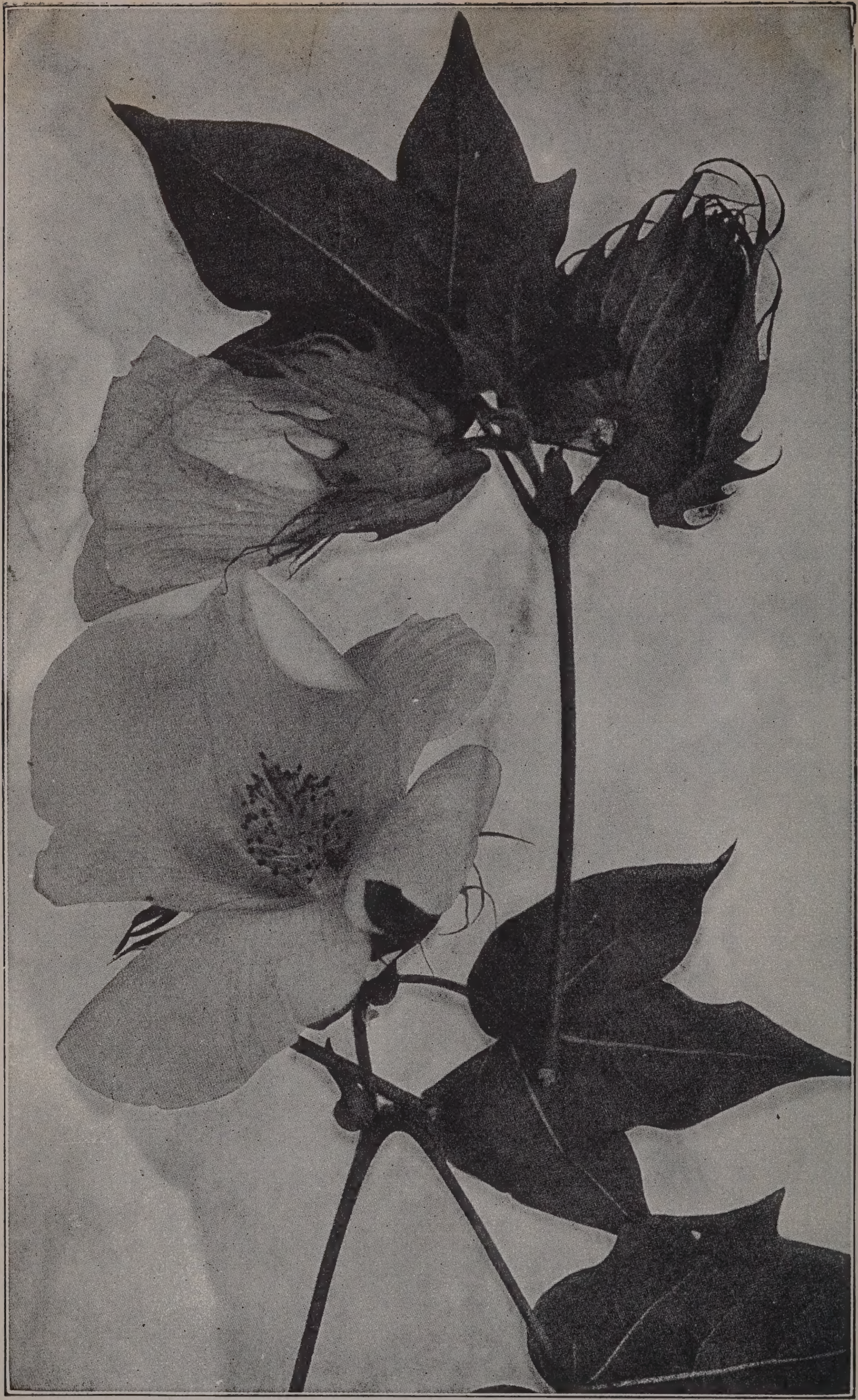
Cotton requires six or seven months of favorable growing weather between spring and fall frost to mature, but picking may extend far into the winter. It thrives in a very warm or even hot temperature, provided the atmosphere is moist, but it will mature a crop on less water than any other crop plant. Any sudden change in temperature, moisture or cultural methods is apt to cause an abortion of the young fruit and flowers.

Usually cotton is planted on ridges or "beds." Fertilizers, when used, are generally drilled into the beds just before planting. The seed are usually drilled in—about one bushel per acre. When the plants are three or four inches high they are hoed or "chopped" out, single plants being left standing from 12 to 24 inches apart, distance depending upon luxuriance of growth and type of cotton

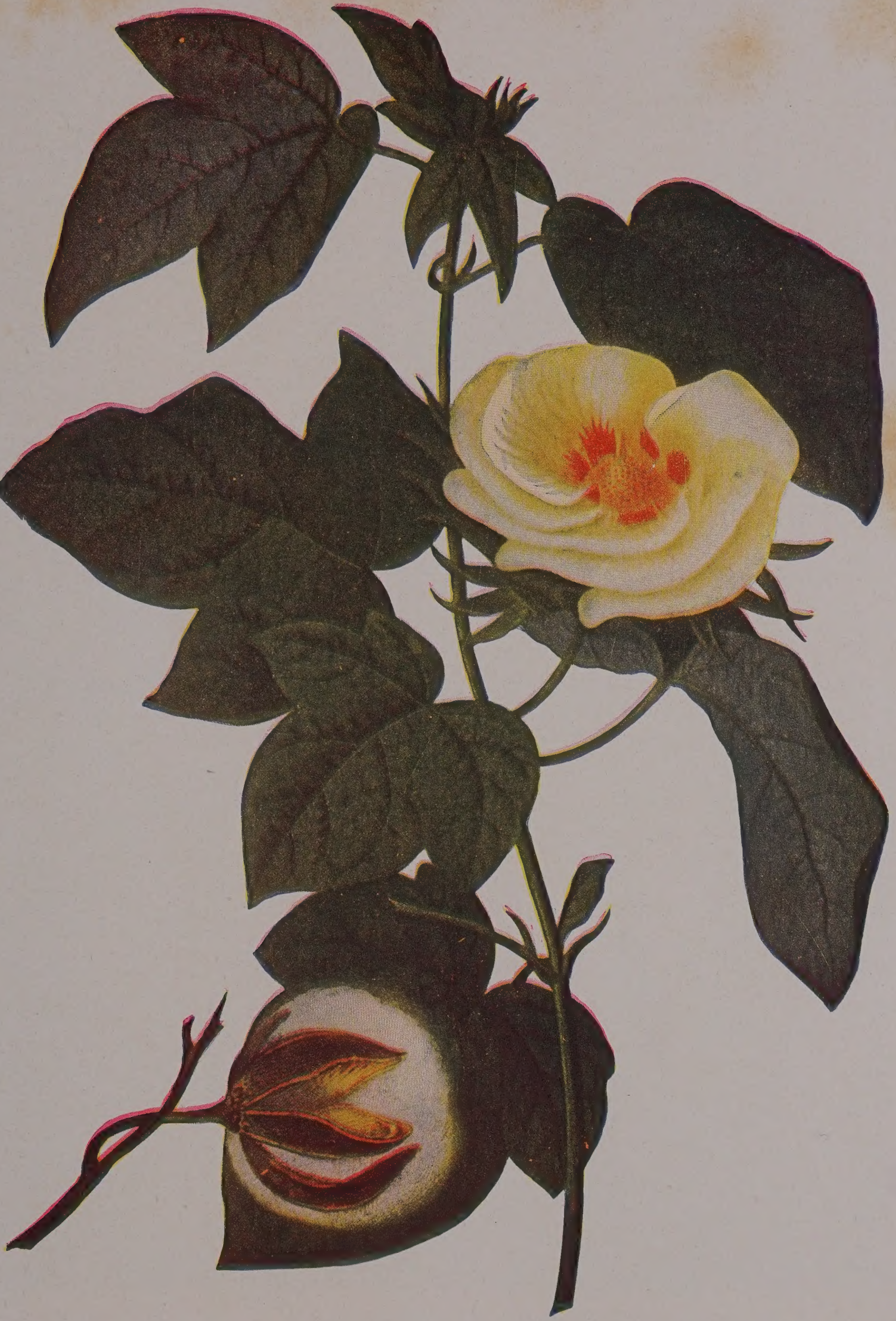
Generally speaking the best concentrated fertilizer to be used is one containing soluble phosphoric acid, available potash and available nitrogen, although the nitrogen may be omitted if it has been previously supplied with green manure, legumes or barnyard manure.

COTTON PICKING AND GINNING

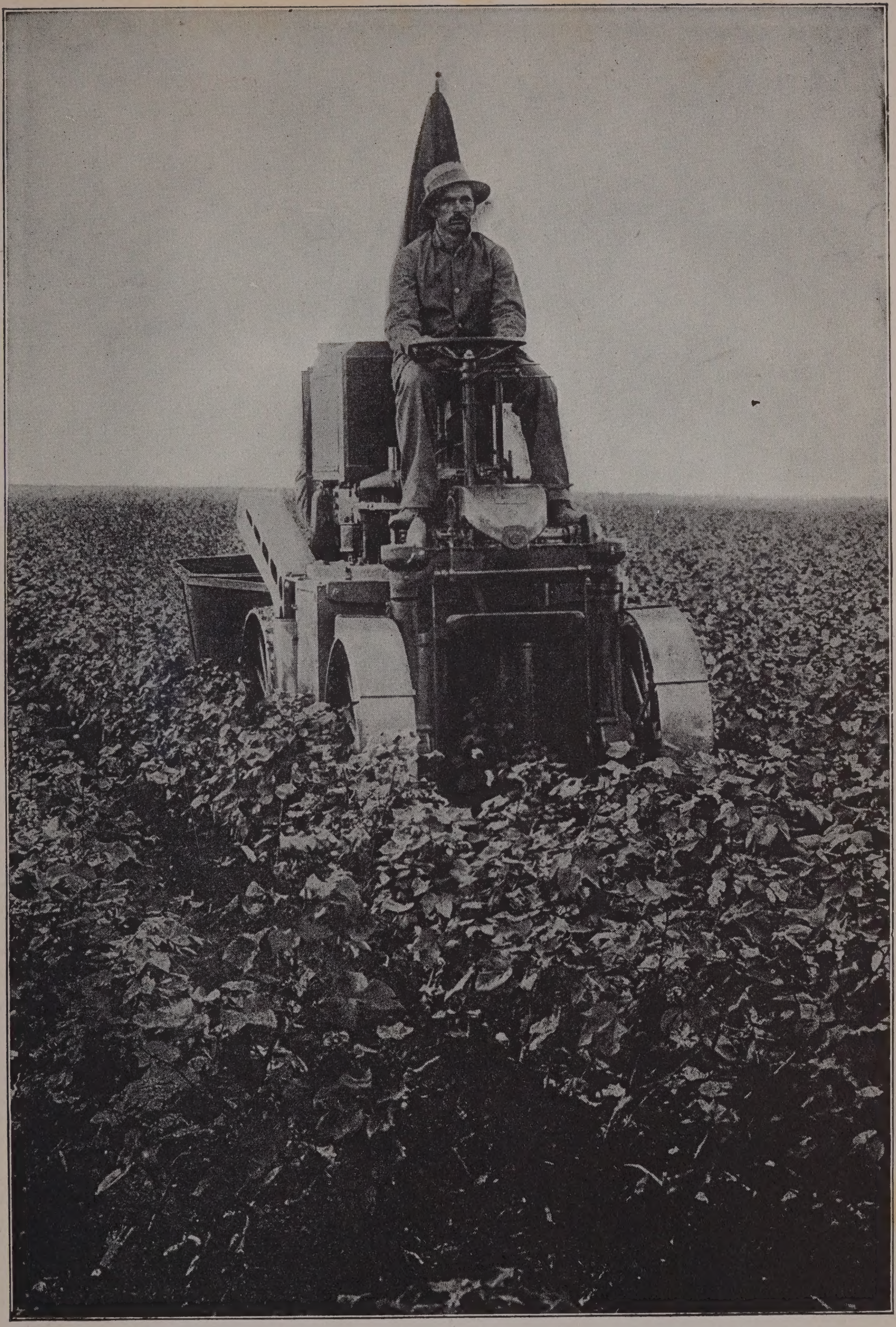
Mechanical pickers have been devised, but do not show the discrimination of the human being in avoiding immature cotton, nor adaptability to the irregularities of the average cotton field. After picking, the cotton is hauled in large boxed wagons to the gin (see Eli Whitney). It is sucked from the wagon through long tubes and distributed directly to the several gins in the gin house. A continuation of this sucking or blowing apparatus collects the ginned cotton and passes it to the compress



LEAVES, FLOWER AND BOLL OF KERCHI COTTON (Natural Size) FROM UNITED STATES DEPARTMENT OF AGRICULTURE.



COTTON (Gossypium)
Native plant from which staple varieties have been derived



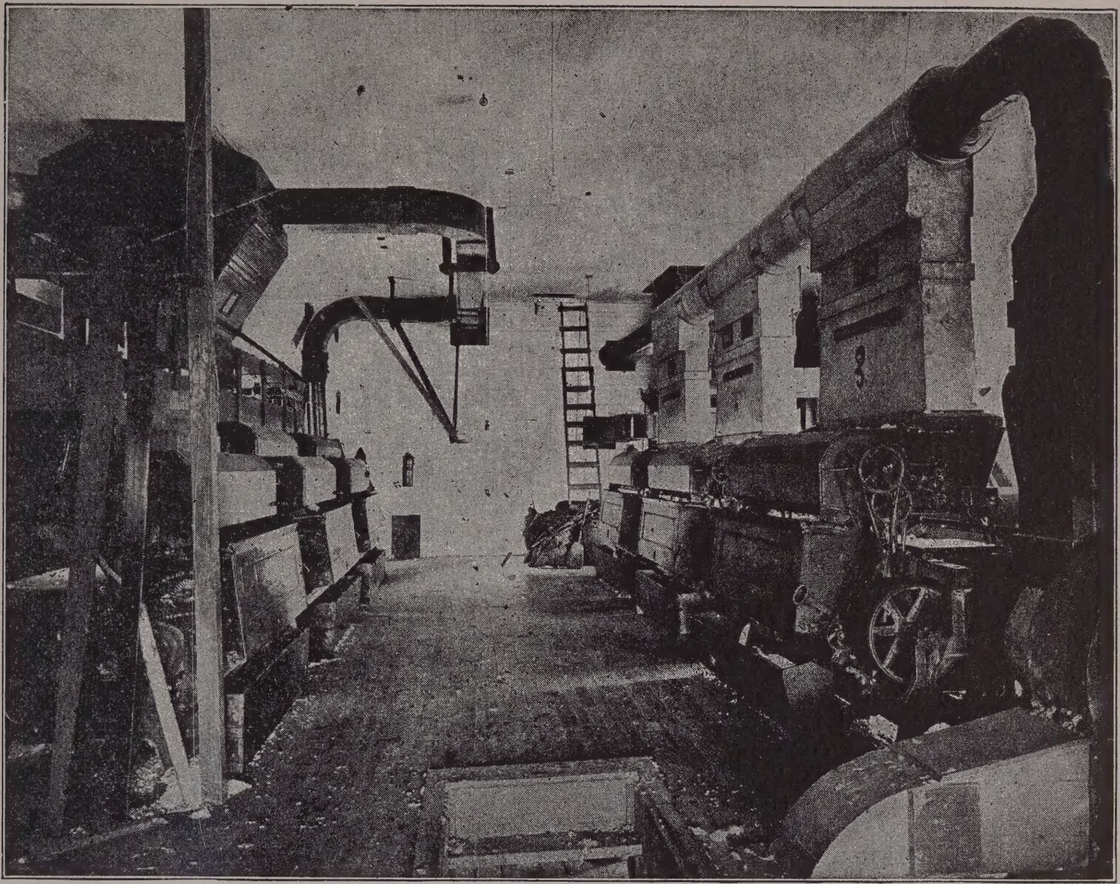
A COTTON-PICKING MACHINE
which does the work of thirty "hands." Revolving cylinders carry steel fingers which pick the cotton fiber, and leave the unripe bolls and the plant unharmed.

Copyright 1898
By Russell Bros. Anniston, Ala
No 390

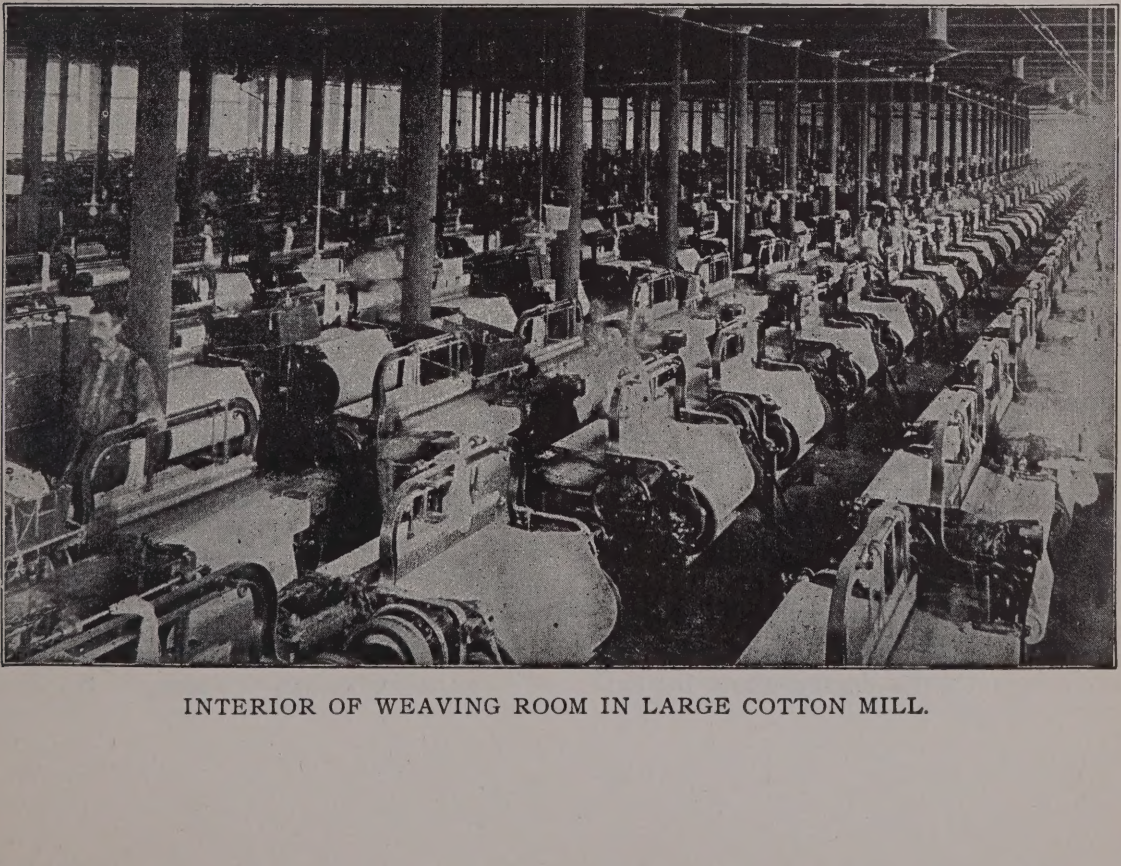
PICKING COTTON BY HAND.

AITING FOR MARKET
TO ADVANCE

COTTON ARRIVING AT MARKET.



A COTTON GIN WHICH SEPARATES THE SEED FROM THE COTTON.



INTERIOR OF WEAVING ROOM IN LARGE COTTON MILL.

where it is compressed in large boxes. From the box it is swung around to the baler, further compressed, covered with coarse burlap and bound with metal straps. Each bale weighing about 500 lbs. is marked for identification and with its actual weight.

HOW COTTON IS BOUGHT

Cotton, the fibers of which are not over $1\frac{1}{8}$ inches long is known as short cotton and is sold by grade from samples taken from each bale. Grading is based on color and relative amount of trash and stained fibers present. Short cotton constitutes the great bulk of that produced in this country and is used in making the cheaper grades of goods. Additional factors of length, strength and uniformity of fiber enter into the value of long staple cottons, premiums generally being given for each $\frac{1}{16}$ inch in length. The finer fabrics, including muslins and laces (*q. v.*) are made from long staple cotton.

The linters or fuzz remaining on the seed of Upland cotton after ginning yields batting, wadding, stuffing for pads, etc., and "lambs wool" for fleece-lined underwear. The hulls are used in cattle feed, fertilizers and paper stock. From the seed oil is made, which is used in lard compounds, cooking and salad oils and soap stocks, while the "cake" (residue after pressing the oil from the kernels) is used in fertilizers, dye stuffs, cattle and poultry feed, confectionery and flour.

ENEMIES OF COTTON

Cotton is subject to diseases, such as leaf blight, shedding of bolls, root, and boll rot and root galls.

The principal insect enemies are the cotton worm, the boll worm, and the Mexican boll weevil. Of these, the weevil is the worst, but by community effort the number of early weevils may generally be so reduced that a crop may be well advanced before the insects become hopelessly abundant.

G. S. MELOY

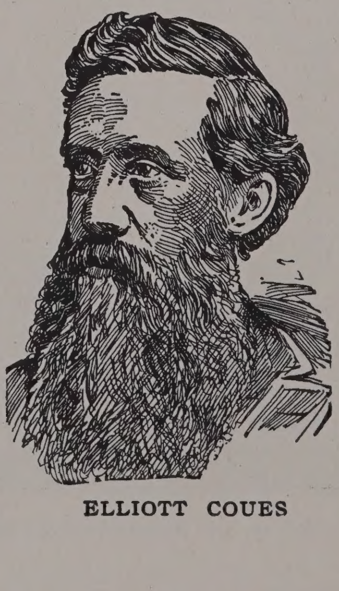
U. S. Department of Agriculture.

Cotton, John (1585–1652) an eminent Puritan minister, was for 20 years pastor of Boston in Lincolnshire, England, and for almost as long in Boston, New England. Cotton, whose Puritan leanings made him an object of suspicion under the primacy of Laud, was to have been brought before the Court of High Commission for trial. He escaped, however, to London and, later, to Boston, New England. Both in England and in New England, the reputation of Cotton for learning was of the highest. He had an absolute command of Latin, Greek and Hebrew; and loved "to sweeten his mouth with a piece of Calvin" at the close of his day of twelve hours' study. Cotton opposed Anne Hutchinson, whom he had at first been disposed to favor; and disputed also with Roger Williams. Among his many works was the catechism *Milk for Babes.*

Cottonworm, the larva of a moth doing great damage to the cotton-plant by eating the foliage. It is estimated by officials of the United States government that the loss occasioned by this insect in a year of great abundance of cotton-plants amounts to 30 million dollars. The average loss is placed at 15 million dollars. The perfect insect is a small, brownish moth, which flies at night and deposits eggs on the under side of the leaves of the cotton-plant. These eggs hatch in mid-summer within three days, and at once is begun the destruction of the leaves. The larva, when full-grown, is about an inch and three fourths in length, of a light-green color, striped with white and black and spotted with black and yellow. When through feeding, the caterpillar folds a leaf about itself, spins a cocoon and pupates; shortly after emerging, the moth lays her eggs. There may be seven broods in a single season. A related species destroys cotton in the ball. See Riley: *Entomological Commission's 4th Report* (Washington, 1885); *Bulletin No.* 18, New Series (Washington, 1898).

Cotyledon (*kŏt′ĭ-lē′ dŏn*), the first leaf or leaves developed by an embryo. In seed-plants the cotyledons are developed in the seed, and are more or less different from the usual leaf-form, often being fleshy from containing stored food, as in the bean and acorn. Generally the cotyledons escape from the seed during its germination, but in some cases, as in the acorn, they never leave the seed. See EMBRYO.

Couch, Darius Nash, an American general, was born on July 23, 1822, in Putnam County, New York; and died at Norwalk, Conn., Feb. 12, 1897. After graduating at West Point, he served in the Mexican War as lieutenant of artillery. He entered the Civil War as colonel of the 7th Massachusetts. He took part in the battles of Yorktown, Williamsburg, Fair Oaks, Malvern Hill, Fredericksburg and Chancellorsville. He was made major-general in 1862, and was in command of a division in the battle of Nashville.



ELLIOTT COUES

Coues (*kouz*), **Elliott,** a notable American ornithologist, was born at Portsmouth, N. H., Sept. 9, 1842; and died at Baltimore, Md., Dec. 25, 1899. After graduating at Columbian University, Washington, D. C., in 1861, he entered the military medical service, and was for a time surgeon and naturalist on the U. S. northern-boundary commission. He was subsequently collaborator at the Smithsonian Institution, and secretary and naturalist to the U. S. geological and geographical survey of the territories; was chairman of committee at the Psychical Science congress in 1893; and edited a number of works in biology and on comparative anatomy and zoology. His writings embrace a number of works on his specialty of ornithology, among which are a *Key to North American Birds; Birds of the Northwest and of the Colorado Valley; New England Bird Life; Fur-Bearing Animals.*

Coul'ter. John Merle, a great authority on American botany and head-professor of botany at the University of Chicago, was born at Ningpo, China, of American parentage, Nov. 20, 1851. After graduating at Hanover College, Indiana, he spent a year as botanist on the U. S. geological survey in the Rocky Mountains. He was afterward successively professor of natural sciences in his *alma mater;* professor of biology at Wabash College; president of the University of Indiana; and president (1893-96) of Lake Forest University. Since 1896 he has been attached to the University of Chicago, in charge of his special department. His published works include a *Synopsis of the Flora of Colorado;* a *Manual of Rocky Mountain Botany; Handbook of Plant Dissection; Manual of the Botany of Western Texas;* and an edition, as editor, of Gray's *Manual of Botany.*

Coun'cil Bluffs, a city of Pottawattomie County, Iowa, lies not far from the old meeting-point of the Indian tribes. Here the Mormons tarried from 1846 to 1849, while on their way to Utah. For many years it was the last village in civilized America, and here California emigrants and trappers got their outfits before entering the Indian country. It lies across the Missouri from Omaha, Neb. Six railroads, running west from Chicago, here meet the Union Pacific line, and others turn to the north and south. The city's industries include manufactures of paper, iron, carriages and agricultural machines. Population, 40,000.

Courthope (*kōrt'ŏp*), **William John,** an English critic and man-of-letters, was born in Sussex, England, July 17, 1842, and educated at Harrow and Oxford. At the latter he won the chancellor's gold medal for verse, and also was Newdigate prizeman. He was one of the founders of the English *National Review* and a staff member of the *Quarterly Review;* subsequently he was appointed civil-service examiner in the government education department, and was made a Companion of the Bath. From 1895 to 1901 he was professor of poetry in the University of Oxford. He has edited an elaborate edition of *Pope's Works, with Life;* a *Life of Addison* (in the English Men of Letters Series); a *History of English Poetry;* and a burlesque in allegory, entitled *The Paradise of Birds.*

Courtney, The Right Reverend Frederick, Bishop. Rector, St. James Church, New York. Born at Plymouth, England, in 1837. Graduated from Kings College, London, 1863. Came to New York in 1876 as assistant at St. Thomas' Church. Was made Rector of St. Paul's, Boston, in 1882, and bishop of Nova Scotia, 1888 to 1904, attended the Lambeth Conference in 1888. He holds honorary degrees from several universities, and is much admired as preacher and bishop.

Courts of Justice. Courts of justice in primitive times either were the people assembled or the king and his advisers. Their activity has always been of two kinds: either to punish or to arbitrate. Criminal cases are those in which the community punishes the offender; civil cases, those in which the community decides a dispute. In early days the court was all important; but when the community entrusted justice to a few specially selected men, it laid down laws by which they should be in part guided; and those selected men laid down further rules to guide their successors. So that now a court of justice is always subordinate to a system of law and precedents, which it may not alter, but which it must *interpret* to fit the case before it. In the early Roman republic the people's assembly, the *comitia,* tried all important cases. In the Roman empire there was established a regular system of courts, in which we may distinguish courts of *original jurisdiction* and courts of *appeal.* The former try cases at first hand. An appeal may be taken only from an inferior to a superior court. The Romans also established a distinction still preserved between common law and equity; the former being the laws and customs current in the community, and the latter principles of justice laid down by judges at various times and finally brought together in a system.

Our Teutonic ancestors preserved through the middle ages the right of being tried, not indeed by the whole people, but by some of them, usually six or more, of about the same rank as the accused. That is, they were his peers. This *trial by jury* Englishmen especially held precious, and we in America still regard it as necessary to securing justice. (See the Constitution, Article III, Section 2, and Amendments V, VI and VII). On the continent of Europe, except in the cities, the model generally followed was that of the courts of the church, in which the essential thing was a trained judge. Since the French Revolution, however, the jury-system has become common on the continent.

As our system of courts is largely derived from that of England, we may note that in that country the lowest court is everywhere the justice of the peace, who in the cities is called a police-magistrate. He deals chiefly with minor offenses and also settles many civil disputes in small matters. But disputes concerning matters that must be entered on the public and permanent records, such as the right to real estate, wills, divorces, etc., are referred at once to local *courts of record*, the borough or county courts. These are called inferior courts. These courts also deal with offenses of greater importance.

Since 1873 the superior courts include the *Supreme Court*. This includes "His Majesty's High Court of Justice," which has such divisions as the Chancery division (dealing chiefly with cases of *equity*), the Kings Bench (or *common law* division), the probate (*wills*) and the admiralty (*navigation*) divisions. All these courts have original jurisdiction. The Court of Appeals includes several divisional courts, and also a final Court of Appeals, the highest regular court in the Kingdom. But in some cases the matter may be appealed to the House of Lords, and in cases affecting India, the colonies and foreign countries the Privy Council is the final court.

In England all judges are appointed, and appointed for life. The English believe with some reason that they have thereby secured a more honest and a more able administration of justice.

The United States courts either are Federal or state courts. In state courts, except that the judges or justices are elected by the people, in most cases for a term of years, the lower courts are very like those of England, both in name and in powers. In some states, the county-judges receive such names as judge of quarter-sessions. But the essential point is that he is a judge of record and that he tries more important cases but not, as a rule, the most important cases.

In some states these county-courts have, besides the above powers, those of a circuit or superior court. Commonly, however, the superior or *circuit-courts* are distinct. They are elected by a larger division of the state, containing several counties, and for longer terms. They have original jurisdiction in the most important cases. There is finally a system of *courts of appeal*, including two or more divisional courts, and then a final court of impeachment for the trial of judges and of the executive. The distinction between courts of law and courts of equity is preserved only in a few states. Most states have a special county-judge for dealing with the property of persons deceased. His court has various names, as surrogate's, prerogative or orphan's court. In general, the higher judges are elected or appointed for longer terms. In many states they hold office for life and during good behavior. In a few cases they are elected, not by the people, but by the legislature. In a few others the governor appoints them.

Federal courts include the senate as a court of impeachment (see CONGRESS), the Supreme Court, the Court of Claims, Commerce-Court and District-Courts. The Supreme Court consists of nine judges, the Chief-Justice and eight associates; but the number may be increased at the will of Congress; which also may, on the death or retirement of a justice, refuse to provide for a successor. The justices are nominated by the president and confirmed by the senate. They are appointed for life, but may be removed by impeachment. All federal judges are thus appointed. The supreme court was established by the constitution, and cannot be abolished by Congress; but the circuit and district-courts as well as the court of claims may be so abolished. The supreme court sits at Washington from October to July each year. There are nine circuit-courts, to each of which a supreme-court justice is assigned. There are 25 circuit-judges (1903). Each circuit has two kinds of courts: (1) a court of orginal jurisdiction, which may consist of the supreme-court justice of the circuit, or a circuit-judge, or a district-judge of the circuit or any two of them; (2) a circuit-court of appeals, to which cases from the first class or from district-courts may be appealed. This consists of three judges of the circuit, but must not include the judge who tried the case. There are 69 district-courts, with a judge, clerk, marshal and attorney. Appeals may be made from the district-court to the circuit-court of appeal; and in important cases from that court to the supreme court. The court of claims deals with claims of private persons against the Federal government; appeals from its decisions are direct to the supreme court. The courts in the territories and in the District of Columbia are established by Congress, but are not Federal courts. The judges serve for four years; whereas all Federal judges are appointed for life. The Federal courts may only try cases which are directly removed by the constitution from the decision of the state-courts. Wherever a state-court faces the question of whether a Federal treaty or statute or act of authority is valid or applicacable to a case in dispute, and decides that it is not valid or is not applicable, then the person who claims that it is, has the right of appeal to the Federal court, as a state is not competent to decide on such a matter. However, no person has the right to force a state into the courts (Eleventh Amendment). In all criminal cases and suits at common law before a Federal court, a Federal jury must be summoned to try the case. The supreme court tries all cases concerning ambassadors and other ministers from foreign countries and all cases where a state brings action against another state or the citizens of another state or a foreign country. In these cases the suit is at once brought before the supreme court; but in other cases—which include, besides those mentioned already, cases that involve laws of navigation and controversies wherein the United States is a party—in all such cases the state-courts or lower Federal courts must try the matter first, and appeal may then be made according to the principles already mentioned.

The Federal courts do not create laws, and are bound even more strictly than state-courts to interpreting the law, viz., the constitution and the enactments of Congress, always preserving the sovereignty of the constitution. It is wrong to speak of the supreme court as superior to Congress, in contrast with the British courts, which are subordinate to Parliament. The difference is that in England the Parliament is superior to all authority whatsoever, there being no constitution to overrule it, while in America, Congress and the supreme court alike are subject to the constitution. Of course the will of the people is the final judge in both countries. At the same time, because the supreme court has the duty of interpreting the constitution, which needs a great deal of interpreting to apply it to all the changes of modern life, it has in fact a great deal to say as to what regulations shall govern us. For example, the constitution does not forbid, explicitly, a graduated income-tax; but the supreme court forbids it by its interpretation of the constitution. The constitution being difficult to amend, that interpretation, and nothing else, prevented at one time the collecting of such a tax.

In like manner the state-courts of every state have the power of interpreting the constitution of the state and of deciding whether the acts of the legislature and executive are in accordance with it. Whenever Federal or state-courts decide against the constitutionality of an act, it is void, as if it had never been passed or done. But it is the rule that where there is doubt in the matter, the benefit of the doubt is to be given to the act or statute.

PERCY HUGHES.

Courts-Martial, in their modern form, as regular tribunals set up by Congress or in minor cases by a military or naval commander, for the trial of offences against martial law or discipline in the army, navy or marines, date from an ordinance of Charles I, and are referred to in the first mutiny-act of William and Mary. Both in America and England there are several grades of courts-martial. In the highest or general courts, the more serious offences and also all charges against commissioned officers are tried. Often, when evidence is to be gathered, courts of inquiry are set up for this purpose. These courts in America may summon witnesses upon oath; but in England they have no such legal powers. When sentence of death is decreed, it is usually by shooting. The old-fashioned drumhead courts-martial, held upon the field before passion had time to cool and before full evidence could be gathered, are no longer held. Summary courts may, however, be held, in America in the place of regimental and garrison courts, and in the British army chiefly to try offences committed upon active service abroad, when it is difficult to have the offenders tried in the ordinary courts. The more serious offences are never tried by such courts, which in the United States consist of but a single officer. Courts-martial have the defect that their members belong to one and the same class, and may have a special army or navy sentiment. In a court-martial the prisoner at present has much the same privileges of having an advocate, a right to reply, etc. as in the ordinary criminal courts. The judges are of equal or superior rank to the prisoner.

Court of International Justice, or World Court. A permanent Court for the settlement of international disputes established at The Hague, Holland, in accordance with the League of Nations covenant, which formed part of the Versailles treaty of peace with Germany. It is composed of eleven judges and four deputy judges, representing different nations and elected for nine years. It meets at least once a year, in June, but the presiding judge, who must reside at The Hague, may summon an extraordinary session whenever necessary. The judges are elected by the Assembly and Council of the League of Nations, and the first set of judges were elected in September, 1921, the court assembling for the first time in the Carnegie Peace Palace at The Hague on February 15, 1922. An American, John Bassett Moore, is one of the judges, but the United States has hitherto refused to participate in support of the World Court because of its affiliation with the League which this country declines to join. President Wilson was instrumental in the establishment of such a Court, and Presidents Harding and Coolidge recommended our adhesion to it.

On January 27, 1926, the Senate of the United States voted favorably on the proposition that the United States should become a member of the Court.

The United States, in its treaty with the World Court regarding its entrance into the court, made several reservations. In the first place, the United States may withdraw from the World Court whenever it wishes. Second, there must be a favorable two-thirds vote by the United States Senate before any question in which the United States is a disputing party may be submitted to the World Court. Third, the United States disavows any part in actions by the League of Nations. Fourth, the World Court is prohibited from giving advisory opinions on matters concerning the United States. Fifth, the United States reserves for itself any question which the Monroe Doctrine affects.

Covenanters, a body of the Scottish people, including the greater part of the nation, who during the 16th and the 17th centuries bound themselves by *Covenants* to make and keep the Presbyterian church as the only religion of Scotland. The first was drawn up by John Craig in 1581 and signed by James I. Others like it followed, and in 1638 was drawn up the Solemn League and Covenant, a bond between those opposed to the Catholic and Episcopal churches in Scotland, England and Ireland. It was adopted by the English Parliament. But in Charles II's reign, the covenant-oaths were declared unlawful and, later, treasonable; yet many of the Covenanters kept on taking these oaths until the Revolution of 1688 made it no longer necessary for the Scots to band together for the liberty of their church.

Cov′entry (*kŭv′ en-trĭ*), a city of Warwickshire, England, about the middle of the kingdom, between the four English ports, London, Bristol, Liverpool and Hull. Its chief manufactures are ribbons, watches, bicycles and cloth. St. Michael's Church, which was built between the years 1230 and 1395, is the largest parish-church in England, and has a spire 200 feet in height. St. Mary's Hall, built in the 14th century, with its carved-oak roof and large painted window, is a fine example of ornamental work. In 1043 Earl Leofric and his wife, Lady Godiva, founded here a monastery. Here Richard II stopped the trial by battle between the Dukes of Norfolk and Hereford of which Shakespeare has so well told us in his *Richard II.*

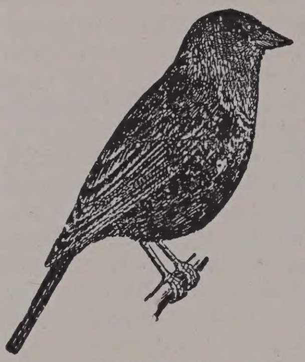
It was here that Mary Queen of Scots was imprisoned and one of George Eliot's homes was located near the town. Population 75,000.

Cov′erdale, Miles, editor of English versions of the Bible, was born in Yorkshire, England, in 1488. He studied at Cambridge, became a priest, and soon left the country. His edition of Tindale's and other men's translations of the Bible came out in 1535. The Psalms of this translation are still used in the Book of Common Prayer, and many of the most beautiful phrases in the famous King James' version are due to Coverdale. It was printed in German black-letter, in double columns, with wood-cuts. In 1538 Cromwell sent him to Paris to take charge of another translation, but the work was stopped and many of the sheets burned. However, the presses and type were smuggled into England, and the translation was brought out; it is known as the Great Bible. Coverdale was also editor of Cranmer's Bible. He was made bishop of Exeter, but was forced to leave England when Mary I came to the throne. He died in 1568.

Coverly, Sir Roger de, a fictitious character in Addison's paper, *The Spectator,* who has charmed lovers of literature for two centuries.

Covington (*kŭv′ĭng-tŭn*), the capital of Kenton County, northern Kentucky, on the Ohio River, opposite Cincinnati, to which it is joined by two fine suspension-bridges. Many of its people are Cincinnati business men; but it is more than a mere suburb of that city, having large distilleries and manufactures of glassware, nails and tobacco. It also has large industries in rolling-mills and in the manufacture of stoves, etc. The Licking River separates it from Newport, Ky. Covington is the seat of a Roman Catholic bishopric, and possesses good schools, churches, a hospital, orphan-asylum and public library. Population 62,000

Cowbird, a bird found in fields feeding near cattle, picking up the insects the animals disturb in their grazing. It sometimes rides on the back of a cow, and often may be seen just in front of one. It makes no nest, but, like the European cuckoos, lays its eggs in the nests of other birds—usually in the nest of a smaller bird. The young cowbird is larger than the other nestlings, but the deception does not seem to be noticed by the foster-mother. The male cowbird is glossy, greenish-black, with head and neck dark coffee-brown. The female is dirty brownish-gray, with whitish throat. They live in small flocks.



COWBIRD

Cowboy. See RANCHING.

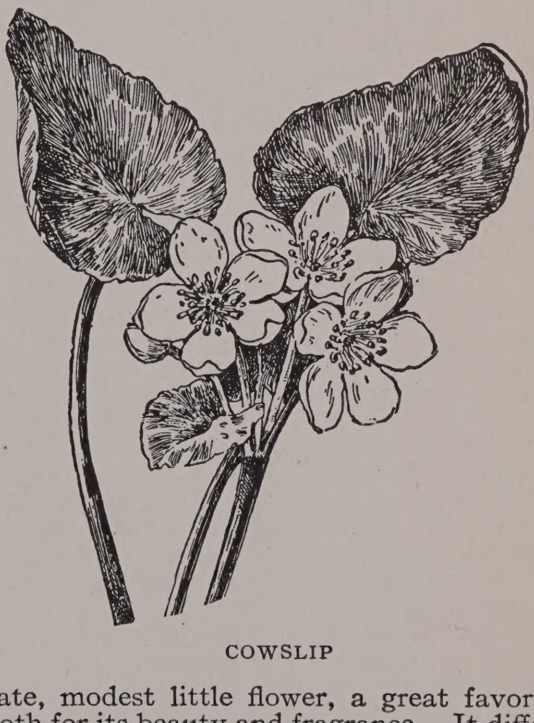
Cow′ley, Abraham, an English poet, was born at London in 1618. His father died before his birth, and it was through his mother's struggles that he got a university education. It was by reading a copy of Spenser's *Faerie Queene*, when hardly more than a child, that he came to write poetry. When ten years old, he wrote good verses, and brought out a book of poems when 15. On the breaking out of the Civil War, he followed the queen in her flight to Paris, and wrote letters in cipher for her to King Charles. Cowley's best known works are *Pindarique Odes* and *The Mistress.* During his lifetime he was held to be the greatest of English poets, but now he is little read. This is probably because he wrote for the court and for the taste of the people of his own time. Nevertheless, some few passages of his are powerful. He also wrote essays, which are much better known than his poetry and rank with those of Goldsmith and Addison. He died on July 28, 1667.

Cow-Peas, a very important leguminous crop for forage and for adding fertility to the soil. They can be grown on soil too poor to support clover. (See NITROGEN-GATHERING CROPS). Its hay yields more dry matter and digestible protein than clover. (See BALANCED RATION.) Being susceptible to frost, the cultivation of most varieties is confined to the southern states. The soy-bean is another leguminous plant much grown for similar purposes. The seeds of both form a valuable concentrated food.

Cow'pens, a village of South Carolina, near which the British under Colonel Tarleton were defeated by the Americans under General Morgan, Jan. 17, 1781. Cornwallis dispatched Tarleton with 1,100 choice troops to drive Morgan into North Carolina. The forces met in an open wood known as Hannah's Cowpens. The Americans, who numbered about 1,000, were drawn up in two lines, with an advance corps of riflemen and a small cavalry reserve. The British charged, driving the riflemen back to the first line, when within bayonet thrust, the first line fell back on the second. A misunderstood order threw the Americans into confusion, and Morgan ordered a retreat to a slight rise where the cavalry were posted. On came the British, but just then the dragoons charged, and at the same time the rear line faced about, poured in a volley at close range, and charged bayonets. The British line was broken and put to flight. The British loss was 800 or 900; the Americans lost 72.

Cowper (*kōō'pẽr* or *kou'pẽr*), **William,** a celebrated English poet, was born in 1731 in Hertfordshire, England. When very young he was sent to Westminster School, where, he complains afterward, "he learned the infernal art of lying." One of his school-fellows was Thurlow, who jokingly promised him an appointment when he should be lord-chancellor, but failed to keep the promise. Cowper studied law and was offered by a cousin a clerkship in the house of lords. But the candidate would have to appear before the bar of the house, and this thought unmanned the poet. A fixed idea that every one was his enemy, the forerunner of madness, took possession of him. He tried to kill himself on several occasions, and for a time was confined in an asylum. After recovering his health, he met his good angel, Mrs. Unwin, in whose family, at Olney, he lived for some time; but his madness burst out again suddenly while he was making a call at the house of his friend, John Newton. He stayed there a year, refusing to go back to his own house, though it was but next door. In 1779, though he never fully recovered, began the brightest period of his life. As yet he had not written a line, but he followed Mrs. Unwin's counsels like a child, and when, to occupy his mind, she asked him to write poetry, poetry he wrote. He had also made the acquaintance of Lady Austen, another angel whose smiles put life into his brain, and her playful request that he write her a poem on something or other, "this sofa, for instance," resulted in *The Task*, Cowper's greatest work. One morning he also read her the famous ballad *John Gilpin*, the story of which she had told him the night before. In 1787 came on another attack of his old trouble, and again he made an attempt upon his life. Yet in these last gloomy years he wrote two of his most beautiful poems, one *Addressed to My Mother's Picture* and another to *My Mary*. See his biography, by Prof. Goldwin Smith, in the English Men of Letters Series. He died on April 25, 1800. Mrs. Browning was inspired by the pathos of his life to write one of her most poignant and appealing poems.

Cow'slip, a common native flower of English pastures, to be met with also in many other parts of Europe. It is a delicate, modest little flower, a great favorite both for its beauty and fragrance. It differs from the common primrose, in having umbels or spreading flower-clusters. These clusters or bells were long thought to be the haunts of fairies, and are still sometimes called fairy-cups. The flower commonly called Cowslip in America is a quite different blossom, a member of the Crowfoot family. It also is known as the Marsh Marigold, but is neither true Marigold nor true Cowslip. In appearance it closely



COWSLIP

resembles the buttercup. By whatever name called, the yellow of the blossom is purest gold, the glossy leaves are of richest green, the familiar cowslip a gladsome blossom of the spring. It grows in marshes, often quite deep in water, and is found north of Carolina and west to the Rocky Mountains. Its stem is hollow, its branches bearing both leaves and flowers. The upper leaves grow on very short stems, thereby not shading the lower leaves, all spreading out broadly to the light. The young plants are sometimes used for "greens." The season of flowering is quite long, from April to June.

Cox, Sir George William, an English cleric and historian, was born in 1827, and educated at Rugby and at Trinity College, Oxford. He held several curacies, and became rector of Scrayingham in Yorkshire. He wrote largely on Grecian history and mythology. His chief works are *A Manual of Mythology; Mythology of the Aryan Nations;* a *History of Greece; Introduction to the Science of Comparative Mythology and Folk-Lore;* and a *Life of Bishop Colenso.* With Dr. Brande he edited a *Dictionary of Science and Literature.* His death occurred in 1902.

Cox, Jacob Dolson, an American soldier and statesman, was born at Montreal, Oct. 27, 1828. He studied law and began practice in Warren, O. He was a member of the state senate when the Civil War began in 1861, and also was a brigadier-general of militia. He at once entered the Federal army and rendered conspicuous service throughout the war, taking part in many of the important battles and advancing to the rank of major-general. He was elected governor of Ohio, in 1866; was secretary of the interior in President Grant's cabinet in 1869; member of Congress from 1877 to 1879; and in 1885 became president of Cincinnati University. General Cox's qualities as a student and scholar, as well as a brave and capable general, gave value to his contributions to history of the great struggle, which include *Atlanta* (1882); *The March to the Sea* (1882); and *Military Reminiscences,* the latter being published after his death (Aug. 4, 1900).

Cox, Kenyon, American painter, was born at Warren, O., Oct. 27, 1856, and studied art in Cincinnati, Philadelphia and Paris. In the latter city he was a pupil of Gérôme. In 1882 he became a member of the Society of American Artists, and settled in New York to pursue his profession. His pictures are chiefly portraits and figure-pieces, together with designs for book-illustration. Among the latter is his work done on Rossetti's *The Blessed Damozel;* he has also painted decorations in the Library of Congress and Bowdoin College. He died in 1919.

Cox, Palmer, American artist and author, was born at Granby, Quebec, April 28, 1840, and was educated at the academy of his native town. In early manhood he drifted to California, where he developed his native taste for drawing and sketching, while at the same time contributing to periodicals. He afterward returned east and settled in New York, where he contributed and illustrated a series of popular papers for the young, later published as *The Brownie Stories, The Brownies at Home, The Brownies through the Union, The Brownies in Fairyland,* etc. He also issued *Queer People with Claws and Paws; How Columbus Found America,* etc.

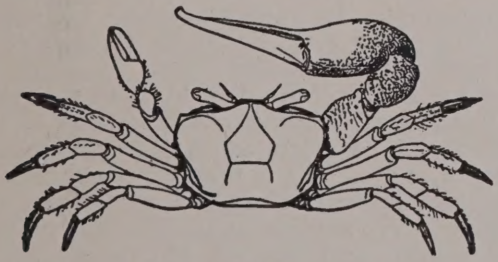
Cox, Samuel Sullivan, American politician and diplomat, was born at Zanesville, O., in 1824, and died at New York on Sept. 10, 1889. After graduating at Brown University he became editor of *The Statesman,* a Columbus, Ohio, journal, in which appeared a flowery description of a sunset, which earned him the sobriquet of Sunset Cox. For over 30 years he was a member of Congress, where his humor and debating power earned him influence. In 1885-86 he was United States minister to Turkey. He was the author of several works, among which are *A Buckeye Abroad; Eight Years in Congress; Why We Laugh;* and *Three Decades of Federal Legislation.*

Coyote (*kī-ōt'* or *kī-ō'tē*). See Wolf.

Crab, a short-tailed relative of the lobster and fresh-water crayfish. The lobster and crayfish each have a long tail, and so has the crab during its early life; the reduction of the tail is a case of modification. The crab is the highest member of the class of animals (*Crustacea*) which contains the shrimps, prawns, lobsters and crayfish. It has five pairs of legs and on this account is often called a *Decapod* or ten-footed animal. The first pair of legs ends in large claws, somewhat like those of the lobster, but smaller; the other four pairs are walking legs. The head-end is covered by a broadly expanded buckler or shield. (See illustration.) This is an outgrowth of the horney covering of the body,

CRAB

and it covers the segments or rings of the body that are closely crowded under it, and serves to conceal the fact that the entire body of the crab is really composed of a number of segments. Those in the tail, or abdomen, are clearly separate joints, but those in front are much modified, crowded together, and covered by the before-mentioned buckler. This is technically named the carapace. It serves also to cover two gill-chambers on each side of the body. The gills are feather-like expansions of a membrane that is richly provided with blood-vessels. Within each gill-chamber is a water-scoop, the movement of which throws the water out in front and keeps a current of water running over the gills. On the head are short antennæ and eyes on stalks; the stalks are short in the common crab, but in some of its relatives are of considerable length. The horny outer covering is the same kind of substance (chitin) that forms the wing-covers and hard parts of insects, but in the case of the crabs it also contains a limy or earthy substance. As the animals grow, the outer covering becomes too small, and moulting is necessary. The hard shell is cracked and thrown off, through great exertions on the part of the animal. The moulting process takes away, also, the lining of the mouth and stomach and the outer covering of the eyes. The deserted shells are often to be picked up. The new shell is at first thin and flexible; it begins to form under the old one before the latter is cast off. Directly after moulting, while the shell is still soft, the animals are shy and conceal themselves. The eggs of the common sea-crabs are attached, underneath the tail, to the swimming appendages, and the young hatch there. The young of the crabs pass through several stages after hatching, before they come to look like their parents. In all of these early stages they have long tails, and, in one of them, they resemble the lobster. There are many varieties of crabs: The fiddler-crab has one large claw and one small one; the large claw is held in such a manner as to suggest a violin, and the small one in such a position as to represent the bow. The spider-crab resembles in a general way a large spider. Some are good swimmers and others live upon the land. Some kinds are eaten. The largest known crab is a marine form of Japan, which is 22 inches between the biting claws. Some of the land-crabs are swift runners and live in holes. In the island of Ceylon one of the latter catches young birds, and even young rabbits are drawn by them from their holes and eaten.



FIDDLER-CRAB

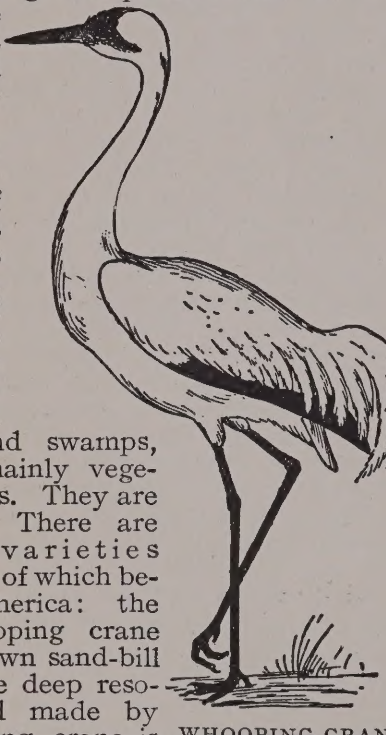
Crabbe (*krăb*), **George,** an English poet, was born on Christmas Eve, 1754, at Aldeburgh, England. He served as a surgeon's apprentice, where he had to help the plowboy, and also picked up a little surgery at odd hours while working in his uncle's warehouse in London. But after a three years' struggling practice at home, he went to London with $15 in his pocket to try his fortune as a writer. He fought poverty bravely, having at times of stress to pawn his clothes and surgical instruments. At last, threatened with arrest for debt, he timidly left a letter at Burke's door and paced Westminster bridge all night till daybreak. But the great Burke was generous, and from that hour Crabbe was a made man. He became a clergyman and a busy writer. *The Village, The Parish Register* and *Tales of the Hall* are some of his poems. Many he never published, but burned yearly in a grand bonfire. Jane Austen is stated to have said that the poet was the only man she would care to marry. Byron, Wordsworth, Scott, Jeffrey, Cardinal Newman and other writers have praised his life-like painting of the scenery, fisherfolk and peasantry of his neighborhood. He died on Feb. 3, 1832.

Craigie, Mrs. Pearl Mary ("John Oliver Hobbes"), Anglo-American novelist, was born at Boston, Mass., Nov. 3, 1867, and was the daughter of J. Morgan Richards. She was privately educated, and studied music in Paris and the classics at University College, London. In 1887 she married Reginald Walpole Craigie, and after a separation obtained a divorce in 1895 and the custody of her child. Meanwhile she had been received into the Roman communion. Her literary career began in 1891 with the publication of *Some Emotions and a Moral,* which was followed by *The Sinner's Comedy, A Study in Temptations* and *The Gods, Some Mortals and Lord Wickenham.* In these clever stories she showed herself a brilliant writer and a master of epigram. Her later work, besides the novel, *The School for Saints,* consisted chiefly of plays, of which the most successful was *The Ambassador* and a drama entitled *Repentance.* She died on Aug. 13, 1906.

Craik (*krāk*), **Mrs. Dinah Maria Mulock,** was born at Stoke-upon-Trent in 1826. When but a girl she supported her invalid mother and ten younger brothers by writing stories for fashion-magazines. In 1849 her first novel, *The Ogilvies,* came out, and she afterward brought out some 50 works—novels, poetry and essays. Her fame rests chiefly on *John Halifax, Gentleman*, published in 1857, one of the most popular books of the century, and translated into French, German, Italian, Greek and Russian. She died in Kent in 1887.

Cran'berry, the general name of the trailing species of *Vaccinum*, a genus belonging to the heath family. In North America there are two species of true cranberry, the small (*V. oxycoccus*) and the large (*V. macrocarpon*). They grow in swamps, and the red berries, ripening late, are familiar in the markets. The large cranberry is more extensively cultivated in the United States, the three centers of cultivation being Cape Cod, New Jersey and Wisconsin.

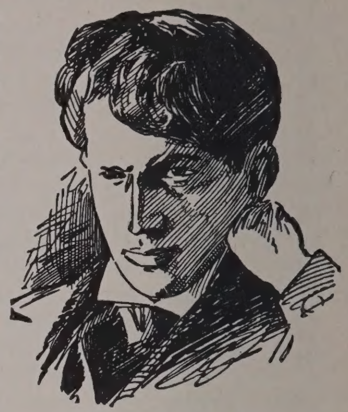
Crane, a large, long-legged bird with long neck and large compressed bill. It is related to the rail and not far removed from the herons, though it is wrong to call any of the herons a crane as is done in the case of the blue heron. The cranes live mostly in marshes and swamps, and are mainly vegetable feeders. They are migratory. There are about 17 varieties known, two of which belong to America: the white whooping crane and the brown sand-bill crane. The deep resonant sound made by the whooping crane is produced by a coil of the windpipe, in the breastbone. The windpipe of this species is four or five feet long, and 28 inches of it are coiled in the front part of the breastbone.



WHOOPING CRANE

Crane, in mechanics, steam-driven or run by electricity, used for hoisting girders, large stones or other heavy weights, and depositing such on trucks to be moved elsewhere. Traveling cranes are in use also on docks and wharves, where they load and unload machinery, general cargo and heavy merchandize from ship's holds, and also raise anchors and perform similar services. The common type of crane consists of an upright post or revolving shaft, with a projecting jib or arm, at the upper end of which is a fixed pulley, with winding gear, and the windlass on which the tackling is wound. Cranes are commonly constructed of cast-iron and steel, and are fitted with brakes and stopping gear, like other hoisting machinery. Other varieties in ordinary use include derrick, pillar, bridge, walking, traveling and locomotive-cranes severally in use for specific purposes.

Crane, Stephen, American author, journalist and war-correspondent, was born at Newark, N. J., Nov. 1, 1871, and died near Baden, Germany, June 5, 1900. He began newspaper work at the age of 17, and was a correspondent for the *Westminster Gazette* and the N. Y. *Journal* in the Greco-Turkish and the Spanish-American war. He shortened his life, however, by overwork, for between 1892 and 1900 he produced some 14 works in fiction, besides his labors as a war-correspondent. His style is wonderfully graphic and powerful. His best-known works are *The Red Badge of Courage; The Black Riders* and *The Eternal Patience.*



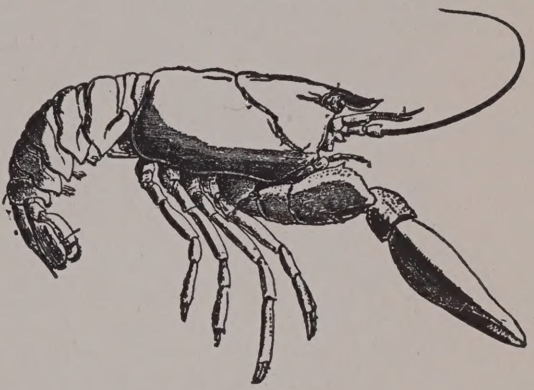
STEPHEN CRANE

Crane, Walter, English decorative artist and painter, was born at Liverpool, England, Aug. 15, 1845, studied under W. G. Linton, the eminent wood-engraver, and was appointed on the committee of the general exhibition of water-color drawings in 1879. He was a knight-commander of the Order of the Royal Crown of Italy. He also for a time was member of the Institute of Painters in water-colors and oils, and was first president of the arts and crafts exhibition founded by him in 1888. He was perhaps most widely known by his work as a book-illustrator and designer of children's picture-books. The Walter Crane toy-books have found their way, it may be said, round the world. His chief canvases include *The Renaissance of Venus* and *The World's Conquerors.* In 1892 he issued *The Claims of Decorative Art;* in 1896 *The Decorative Illustration of Books;* and in 1898 *The Basis of Design.* He died March 15, 1915.

Cran'mer, Thomas, Archbishop of Canterbury, was born at Aslacton, England, July 2, 1489. As a boy he could ride the roughest horse in the shire, and was a keen hunter. He studied at Cambridge, gained a fellowship, and stayed 26 years. In the summer of 1529 he met two officers of Henry VIII, and, the talk turning on the king's divorce, Cranmer said that Henry could satisfy his conscience in that matter by appealing to the universities of Christendom. This pleased Henry much; and the king asked: "Who is this Dr Cranmer? Marry, I trow, he has got the right sow by the ear." So Cranmer became royal chaplain, was sent on embassies to Italy and Germany, and made archbishop of Canterbury. The king found in Cranmer a pliable tool; the servant divorced the master from Catherine, Anne Boleyn and Anne of Cleves. He pleaded timidly in behalf of Anne Boleyn and on behalf also of Henry VIII's vicar-general, Thomas Cromwell; still, if Henry said they were guilty, guilty they were in Cranmer's eyes. Cranmer was instrumental in having the Bible translated, and drifted toward Protestantism. The dying Edward VI won him over to signing the paper that was to make Lady Jane Grey queen instead of Mary. Under Queen Mary the persecuting statutes against heretics were revived, and one of the chief men of the time to suffer was Cranmer, who was condemned for treason, then retried as a heretic. From Oxford gaol he saw the reformers Latimer and Ridley die at the stake, and panic-stricken wrote seven recantations, the last on the morning of March 21, 1556. At once he was taken to church, where he listened to a grim sermon in which he learned that he must burn; but when he was to read his recantation, he instead took back all he had said "from fear of death." He went to the stake cheerfully, and, thrusting his right hand into the flame, kept it there saying: "This hath offended; O this unworthy hand!" See Tennyson's *Queen Mary* for an appreciative view of Cranmer's character.

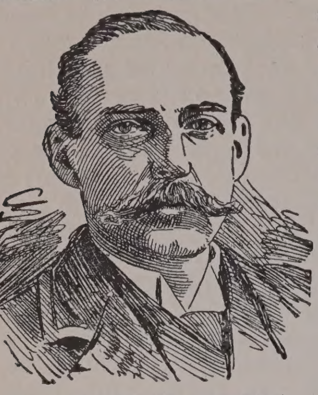
Cran'ston, Rhode Island, a town in Providence County, made up of several villages, with many attractive residences, on the New York, New Haven & Hartford Railroad, and on the western shore of Narraganset Bay about nine miles southwest of Providence. A state-prison, insane asylum, reform-schools, almshouse and workhouse have their seat here. The town was settled early in the 17th century, and incorporated in 1754. Besides its extensive cotton manufactures, it has wire-works, a large brewery and considerable market-gardening. Population, 35,000

Crawfish or **Crayfish,** a fresh-water animal like the lobster, but of smaller size. The front part of the body is covered by a shield-like expansion of the outer shell. This takes in the head and what corresponds to the chest or thorax; it is an expanse of the horny covering of the body, which is made of chitin and hardened by deposits of lime therein. The expansion covers two gill-chambers—one on each side. There are from 18 to 20 pairs of feather-like gills, which are membranous and richly provided with blood-vessels. A gill-bailer lies in the front of each gill-chamber, the movement of which throws the water out of the chamber in little jets and keeps a current of water flowing over the gills. The crayfish is composed of a series of body-rings, but those in front are so crowded together and modified, that it is difficult, at first, to appreciate this fact. If the shield-like expanse (*carapace*) is removed, the furrows separating the segments can be seen. The tail (or abdomen) is composed of six similar rings, and each ring bears a pair of appendages—called in this position swimmerets. The fact that every ring bears one pair of appendages is the key to determining the number of segments in the entire body. If we count the appendages in that region covered by the carapace, we shall find, in all, 14 pairs, and, since each pair represents a ring or segment, we know that there are 14 segments crowded together in the front end of the body. The 14 pairs of appendages are the eyes, the small and the large antennæ, the jaws, surrounded by five pairs of modified mouth-parts; and, finally, the five pairs of limbs. The first pair of these ends in large claws, and the next two pairs in small claws. The crayfishes live abundantly in streams, and often make holes in the bank. They are omnivorous eaters, dead fish, water-snails, tadpoles, frogs, larvæ of insects, vegetable matter in the water and the like being all devoured. The eggs are attached to the swimmerets, and, for some time after hatching, the young cling by their claws to the swimmerets of the mother. They moult or cast off the outer shell, including also the lining of the mouth and stomach, which is horny in nature. The processes of life in the crayfish duplicate those of higher animals, and Huxley showed how a study of the structure, development, distribution and physiology of this one animal introduces us to the general facts of zoology. See Huxley: *The Crayfish.* See CRAB.



CRAWFISH

Crawford, Francis Marion, cosmopolitan American novelist and son of a sculptor, was born at Bagni di Lucca, Italy, Aug. 2, 1854, and was educated partly in the United States and partly in Italy, and had a private tutor at Trinity College, Cambridge, England. He afterward prosecuted his studies at Karlsruhe and at Heidelberg; studied Sanskrit at Rome; and in 1879 proceeded to India to edit a newspaper, *The Indian Herald*, at Allahabad. From 1881 to 1883 he was in America, but after that time for the most part resided at Sorrento in Italy. He published more than 40 novels, from *Mr. Isaacs* in 1882 to *The White Sister*, 1909. His fertility as an author was no less extraordinary than was the wonderful variety and rich interest of his romances. He was one of the most cultured of modern writers of fiction, and his novels, though rarely realistic and hardly ever dependent upon dialect, invariably interest and instruct. The following are others of his novels: *Saracinesca; Marzio's Crucifix*; *Sant' Ilario*; *Don Orsino; Casa Braccio; Zoroaster; A Rose of Yesterday; Corleone;* and *Ave Roma Immortalis.* He died April 9, 1909.



F. MARION CRAWFORD

Crawford, Thomas, an American sculptor, was born at New York in 1814. In 1834 he went to Rome, where he worked under the guidance of Thorwaldsen, the great sculptor. His finest works are the *Washington Monument* at Richmond and the bronze statue of *Liberty* on the dome of the Capitol at Washington. He died at London on Oct. 16, 1857.

Crawfordsville, Ind., a city, the county-seat of Montgomery County, on the Cleve., Cin., Chic. & St. Louis, Vandalia and Monon railways and T. H., I. & E. traction line, 43 miles northwest of Indianapolis. Platted in 1823, it was incorporated as a city in 1865. It is the seat of Wabash College (Presb.), and is famous for the number of distinguished writers it has produced. Its manufactures consist of wire-fence works, wagon, spoke and curb factories and foundry-products, in addition to lumber-mills, carriage-works, etc. Population, 11,000

Crayfish. See CRAWFISH.

Creamery, a dairy-factory enterprise for making butter, cheese and condensed milk, familiar in the chief eastern and middle-western states of the Union in the past 20 years. They are conducted usually by stock or co-operative companies, or by private individuals having experienced and skilled men to conduct and manage them. Recent returns show that close upon 6,000 creameries are in operation over the country; and in the best of them, which now produce a high-grade output, they confine themselves either to butter or to cheese-making, rarely making both in one factory. The states which to-day have the largest number of creameries are New York, Pennsylvania, Wisconsin, Illinois and Minnesota, their seat being in the principal dairy-regions. When the milk is delivered by the farmer to the factory, it is weighed, tested as to quality, and its value credited to the owner-producer; the cream is then separated by power (if it has not previously been separated before being brought to the factory), the farmer usually receiving the skim-milk for feeding. The more general plan followed to-day by the producer is to use the local separator-factory or skimming-station, only the cream being taken to the creamery, thus reducing the cost and trouble of hauling.

Cream-Separator, a machine for taking cream from milk, which depends on the physical principle that the heavier a whirling body is, the greater its tendency to fly from the center. The milk is passed into a vessel revolving at a high rate of speed on its own center. The cream, composed largely of butter-fat, being lighter, stays in the center and escapes by a tube. The heavier skim-milk, flying to the outer sides of the vessel, escapes through perforations into an outer jacket and is carried away by another tube. The machine can be adjusted to separate cream of any desired thickness between certain limits. This thickness can be accurately measured in terms of percentage of butter-fat. 98% of butter-fat can be thus separated as against 75% by the old-fashioned shallow-pan skimming, or 85% by the better deep-setting method, in which cans about 20 inches deep are set in cold water over night and the skim-milk drawn off from below by a faucet. The separator has the advantage of acting quickly, and so making it possible to market the cream with much shorter exposure to the air. Separators will handle from a few pounds of milk per hour up to 4,000 pounds. The smaller ones are usually operated by hand-power. The separator works best at a temperature of between 85 and 100 degrees Fahr. Separator-cream is much purer than that obtained by the gravity-methods, because the impurities, being heavy, fly from the center along with the skim-milk. The separator has made possible the rapid growth of creameries as an organized industry, there being over 5,000 in United States in 1905. These can make butter more economically and of more uniform grade than can be done on the farms. Hand-separators enable the owner of a small number of cows to handle less bulk than he would in hauling milk to a creamery. See, also, BABCOCK TEST.

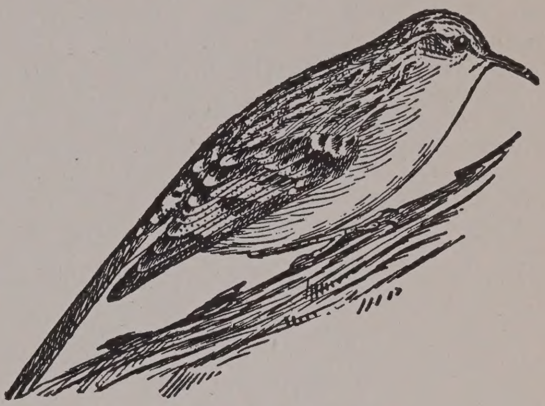
Creation, The, an oratorio by Joseph Haydn, composed during the years 1796-8. The words are selected from *Genesis* and Milton's *Paradise Lost*, with modifications by Baron von Swieten. The oratorio was first produced at Vienna, April 29, 1798, and ranked next to *The Messiah* in popularity until the appearance of Mendelssohn's *Elijah*.

Haydn placed a higher estimate upon *The Creation* than he did upon his second oratorio, *The Seasons*, written during 1798-1800.

Crécy (*krā′sē′*) a town of France, where, on Aug. 26, 1346, Edward III of England, with about 30,000 men, won a brilliant victory over 100,000 French under the Count of Alençon. The flower of French chivalry, together with the blind king of Bohemia, who was fighting on the side of France, fell in this battle. In all, fully 30,000 French bit the dust. Here the Black Prince gained his spurs and adopted the threefold feather-crest of the fallen Bohemian king, with the motto *Ich dien* (I serve), still worn by the Princes of Wales. The battle was one of the earliest in which cannon were used by the English.

Creeks, an Indian tribe, living, when first seen by De Soto in 1540, on the Flint, Chattahoochee, Coosa and Alabama Rivers in Florida. Their own account of themselves is that they came out of the earth, and marched from the northwest to the lands then held by them. From their language, they probably are of the same race as the Choctaws and Chickasaws. Their alliance was courted by the Spaniards in Florida, by the French in Louisiana and by the English in Carolina. During the Revolutionary War they attacked Wayne's army, and at its close many Tories joined them. Washington got some of their chiefs to come to New York and sign a treaty; but they continued still hostile. In the War of 1812 they surprised Fort Mimms, killing 400 men, women and children. They were at once attacked by United States troops and defeated seven times, the last time being utterly crushed by General Jackson at Horseshoe Bend. When hopeless, having lost 2,000 warriors, their country ravaged and their towns laid in ashes, they submitted. Nevertheless, the government treated with them for years before it succeeded in getting them across the Mississippi. One chief, General William McIntosh, who signed a treaty in 1825, was put to death by his enraged countrymen. But when, in 1836, some of the Creeks had attacked the frontier towns of Georgia and Alabama and had been defeated by General Scott, about 25,000, who were still left on their old grounds, were at once sent to join the rest of their nation, between the Arkansas and Canadian Rivers. In the Civil War some joined the north and some the south. Schools and churches were late in obtaining a footing with the Creeks, as their only idea of Christianity was what they learned from the negroes, and the proud warriors would have nothing to do with the slaves' religion. Their government was peculiar. Each town had nothing to do with the others, but was ruled by its own *micco* or king, who was chosen as a ruler. Next to him was the war-chief. Every town had a square in its center, shut in by houses, the *micco* and war-chief having special houses. On this square was held their great feast.

Creeper, Brown, a little, brown, mottled bird that creeps—or rather flashes—round and round a tree in search of larvæ. It is our one member of the family of Creepers. It is a little smaller than the English sparrow; is grayish-white beneath; the brown and gray above very like in coloring to the bark of a tree; it has a slender, curving bill. It is a most diligent bird; it starts from the bottom of a tree and in a sort of spiral climb picks out with utmost care the larvæ in the bark. In climbing it sometimes uses its tail like the woodpecker, the tail being stiff and sharp at the points. The breeding-range is in the northern states and northward; from September to April it may be found from Massachusetts to Florida.


BROWN CREEPER

Cre′ole. See New Orleans.

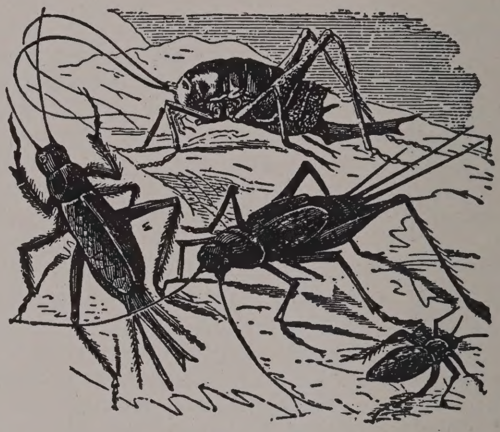
Cress, name of various plants whose leaves are an agreeable relish, much favored in salads. Garden-cress often called peppergrass, is gaining ground in American gardens. In winter it may be grown in flower-pots or boxes, the seed sprouting very quickly; for a supply of tender leaves seed should be sown very frequently. Water-cress is an important market-crop. It can be grown in almost any pool or shallow water course with sand or gravel bottom, being introduced by scattering seeds or some freshly cut branches. It is a hardy perennial.

Creston, Iowa, a city, the seat of Union County, in the south of the state, on the Chic., Burl. and Quincy Railroad, 60 miles southwest of Des Moines. Besides its shipment of live-stock it has extensive railway-car works, machine-shops and wagon-factories. The city, which was settled so recently as 1868, is growing rapidly, and it has a fair showing of public buildings, besides schools and churches. Population 9,000

Crete (*krēt*), a Turkish island in the Mediterranean. It is the southernmost portion of Europe, 160 miles in length and from 7 to 35 broad. The climate is fine, and the air fresh and bracing. Crete is quite mountainous, and its highest peak, Mount Ida, is 8,060 feet above the level of the sea. There are many harbors on the island: Suda Bay on the north is one of the best in the Mediterranean; and Fair Havens, in the south, is spoken of in *Acts*. Wheat and fruit, especially oranges and lemons, are mainly raised. Olive-oil, soap, nuts and the like are exported. Sponges are found on the coast. There are a few wild animals, but not a snake on the island. There are now only three towns of any size, though Vergil told of its "hundred cities." During the past quarter-century the remains of a great civilization have been discovered that equalled those of Egypt and Babylonia, and dates back 2,000 if not 3,000 years before Christ. Crete is now an autonomous Greek province, under Turkish suzerainty, though paying no taxes to Turkey; and its viceroy is always a native Greek Christian. The early Cretans were seafaring Greeks, the rivals of the Phœnicians. Its laws and its great lawgiver, Minos, were famous, as were also its bowmen; while a Cretan came everywhere to mean a liar. Rome, the Saracens, the Greek emperors, Venice and the Turks have in their day owned the island. Its area is 3,365 square miles; and its population is estimated at 310,815. Canea is the capital (population, 24,537).

Crichton (*krĭ'tŭn*), **James,** called the Admirable Crichton was born Aug. 19, 1560, in Perthshire Scotland, and was educated at St. Andrews. After leaving the university he went to France. His swordplay and power as a debater on any subject with the professors of the Sorbonne are said to have astonished all Paris. At Venice the great printer Aldus was his friend. Here he spoke before the doge and senate, and is said to have astounded them with his eloquence and grace. Other encounters took place, in which, it is said, he made Latin poems on the spot, offered to carry on the debate in poetry, and performed like prodigies. Moreover, according to the story, he became tutor to the heir of the duke of Mantua. Here he killed a skillful duelist, and became so renowned that he was attacked one night by three masked men out of jealousy. Crichton's swordsmanship gave him the best of it, and to save his life the leader of the masks was forced to tell who he was. It was Crichton's prince-pupil. The tutor fell on his knee, and, presenting his sword, asked his pardon; but the prince basely ran him through the body. Crichton had a fine memory, is said to have been familiar with 12 languages, and was a good debater, but many of the stories of his prowess are probably fictitious. He perhaps fell in a night-brawl, but that it was his own pupil who dispatched him is unlikely. He died at Mantua, in 1583, or, according to others, some time between 1585 and 1591.

Cricket, an insect related to grasshoppers and locusts. There are three kinds—mole-crickets, true crickets and tree-crickets. The mole-crickets have their front limbs expanded and especially fitted for digging; they make burrows and lay their eggs in underground chambers. The true crickets are very abundant in the fields; they are black, sometimes with brownish wings. They usually feed on plants and lay their eggs in the ground in the autumn, the broods hatching out in the spring. To this division belong, also, the house-crickets. The chirping sound is produced by the males rubbing the file-like edges of the principal vein of their wing-covers upon a scraper located on the margin of the opposite wing-cover. The true wings are not involved in making the sound. The tree-crickets are delicate, whitish-green. They live on trees and shrubs, and often do damage by boring to deposit their eggs. One kind lays its eggs in stems of the raspberry. The katydid is not a cricket.


CRICKETS

Cricket (*krĭk-ĕt*), the Englishman's national game the world over, is an outdoor game with balls, bats and wickets. It is played by 11 men on a side. Two wickets, each consisting of three uprights or stumps rising 27 inches above the ground and with two small pieces or bails on top of the uprights, are placed opposite each other, 22 yards apart. One eleven takes position in the field, the other goes to bat. The bowler of the first eleven stands almost behind one wicket, the wicket-keeper directly behind the other. Two players from the second eleven stand at the wickets, the first batsman in front of one, the second beside the other. The bowler rolls his ball at the opposite wicket, to knock it down or make the batter hit the ball so that it will be caught on the fly and the batsman put out. The batter prevents the wicket from being hit, drives the ball far enough to give time for changing places with the other batter, and so makes runs. These continue so long as there is no risk of the stumps being hit while the batsmen are away from the wickets. If, however, the batter let the ball carry a bail or a stump away; or knock either down himself; or stop the ball with his body; or has the ball caught in the air—he is out. After five balls have been bowled, (sometimes four or six by arrangement), the eleven in the field changes to the same positions for the second wicket that it had for the first. Bowling at the second wicket continues for five balls, but by another bowler, and so it goes until ten men have batted. The eleventh is not out. This makes an inning, but, as a large number of runs may be made by a single batsman, it usually lasts more than a day. Then the other eleven comes to bat, and the first goes to the field. Two whole days at least are required for a first-class two-innings match. The game generally ends with a fourth inning, the eleven with the most runs being the winner. The rules of the Marylebone club (founded 1744) govern the game everywhere.

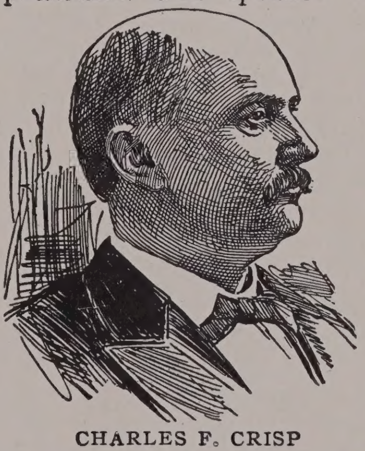
Cricket on the Hearth, The, is one of Dickens' Christmas-Books, and like the others is characterized by a whimsical, almost fantastic humor, while it presents in the most edifying fashion the contrast between greed, selfishness and cunning on the one hand and simple goodness of heart on the other. It is distinguished by a truly dramatic climax. A good husband, believing that his young wife loves another and blaming himself for the loss of her affection, is about to sacrifice his home for her sake, when, to the reader's great relief, the burden of sorrow is suddenly transferred to a despicable old fellow, who had hoped to win a pretty young bride by the power of his money. He loses his bride, but is so moved by the unselfish love of all around him that his own heart is renewed, and he joins happily in the marriage-festivities. The merry chirping of a cricket mingles with the song of the kettle to soften with its music the passions that at times threaten to destroy the peace of home.

Crime'a (the ancient *Chersonesus Taurica*), a peninsula of southern Russia, between the Black Sea and the Sea of Azov. It is about 125 miles from north to south and 200 from east to west, and has an area of about 10,000 square miles. It is joined to the mainland by the isthmus of Perekop. Balaklava and Sebastopol are its two chief harbors. The Crimea was once famous for its wheat, but of recent years the peninsula has suffered much from drought. Porphyry and coal are found. The Crimea's situation in the Black Sea, between Europe and Asia, has made it a tempting prize alike to Greek, Tartar, Turk and Russian.

The Crimean War (1853–56), fought in the peninsula, was caused by Russia's attempt to establish its protection and that of the Greek church over the Christian subjects of Turkey, who, like the Russians, are of the Greek church. Turkey was aided by France, England and Sardinia. The battles of the Alma, Tchernaya, Balaklava and Inkerman were fought, and the fall of the strongest fortress of the Russians, Sebastopol, brought an end to the war. By the treaty of peace Russia gave up all she had gained during the war. Population of the Crimea about 250,000 (80,000 Tartars, 130,000 Russians, 40,000 Greeks, Jews, Bulgarians and Germans).

Cripple Creek, Col., a mining town, situated on the foothills of Pike's Peak, in El Paso County, Colorado. Gold was discovered in its vicinity about 1885, but it was not until 1891 or later that its rich mining-wealth attracted experts and the town began to develop. Its annual production of gold is estimated at about $10,000,000. The town in 1894 was the scene of a miner's strike, and in 1896 it was visited by a destructive fire; but in spite of these drawbacks it has grown apace. Population, 6,206.

Crisp, Charles Frederick, an American politician, and speaker of 52d and 53d Congress, was born at Sheffield, England, Jan. 29, 1845; and died at Atlanta, Ga., Oct. 23, 1896. In early life he settled with his parents in Georgia, and in 1861 entered the Confederate service, in which he rose to the rank of lieutenant and was captured by the Federal forces. After the war he studied law, and in 1872 was elected attorney-general of a judicial district of Georgia, and subsequently became judge of the superior court of the state. In 1882 he was returned as a member of Congress, and in 1892 and 1893 was speaker of the house. In politics he was a Democrat.



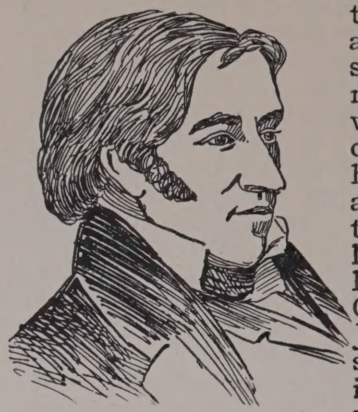
CHARLES F. CRISP

Crispi (*krês′pê*), **Francesco,** an Italian statesman, was born Oct. 4, 1819, at Ribera, Sicily, and became a lawyer at Naples. In 1848 he was one of the heads of the rising at Palermo, and for two years a leader of the Sicilians against Ferdinand I. In 1859 and 1860 he acted with Garibaldi in driving out the Bourbons from Sicily. In 1877 he became a member of the national cabinet, and afterward was premier of the Italy he had helped to make. Here he took high rank among the statesmen of Europe. It is due to Crispi that Italy entered the Triple Alliance with Germany and Austria; and the policy of keeping up the army on a footing with other European states of the first rank and of building up a war-navy was mainly his. He died at Naples, Aug. 11, 1901.

Crit'tenden, John Jordan, was born in Woodford County, Ky., Sept. 10, 1787. He graduated at William and Mary College, Virginia, studied law, and became famous as a criminal lawyer. He served many times in the Kentucky legislature, was six times chosen senator of the United States, and served one term as representative in Congress and one term as governor of Kentucky. He also was attorney-general under Presidents Harrison and Fillmore. He was most prominent just before and during the Civil War. He opposed the repeal of the Missouri Compromise; in the Kansas troubles he sided against the course of Presidents Pierce and Buchanan; when Lincoln was elected he took firm ground for the Union; and in 1860 he proposed amendments to the constitution which, he thought, would allay strife. He strenuously sought to keep Kentucky in the Union, but was unwilling that slaves should be used as soldiers. He remained in public life to the close of his career, being in the midst of a campaign for reelection to Congress when he died near Frankfort, Ky., July 26, 1863.

Crittenden, Thomas Leonidas, son of the above, an American general, was born in Kentucky in 1819, and died on Staten Island, N. Y., Oct. 23, 1893. After studying law he became attorney-general in Kentucky in 1842, and from 1849 to 1853 was United States consul at Liverpool, England. Previous to this, he had served under Taylor in the Mexican War, and on the breaking out of the Civil War he entered the Union army, and was promoted to the rank of major-general and given command of a division of the Army of the Tennessee. Later, he served under Buell and Rosecrans, and at Chickamauga commanded one of the two corps that were routed. Resigning his commission in 1864, he entered the regular army two years later as colonel of the 32d infantry, and was brevetted brigadier-general in 1867. In 1869 he was transferred to the command of the 17th infantry and served on the frontier till 1876, and was in command of Governor's Island until he retired in 1881.

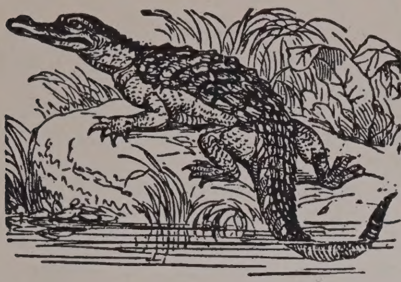
Crock'ett, David, was born at Limestone, Tenn., Aug. 17, 1786. Davy, as he was always called, was sent to school, but on the fourth day he quarreled with the schoolmaster, and, in fear of a thrashing both from his father and from his teacher, he ran away from home, spending his time roaming about with drovers and carriers. When 18, he came home, and for the first time learned his letters. In 1813 he served in the Creek War under Jackson. After serving in the legislature, he was sent to Congress for three terms. But, though at first a follower of Jackson, he had now become opposed to him, and, foreseeing defeat, he thought of starting upon a new career in Texas, which was then in revolt against Mexico. He had all his life been noted as a crack shot, a great hunter and a brave fighter. Here also, in Texas, he became famous for his exploits. He met his death after defending Fort Alamo against a large Mexican force. When only six men were left, the fort was captured, and the six, including Crockett, were shot by order of Santa Anna, March 6, 1836.



DAVID CROCKETT

Crockett, Samuel Rutherford, Scottish novelist, was born at Duchrae, Galloway, Sept. 24, 1860; and was educated at Edinburgh, Heidelberg and Oxford for the Scottish Free-Church ministry, which he entered in 1886, but afterward abandoned for literature. For a time he held a traveling tutorship at Oxford, and this enabled him to see Europe, Asia and Africa. His stories, however, deal chiefly with the homely characters and scenes of his native land. Scottish peasant-life has hardly ever, since the days of Scott and Galt, had so realistic and delightful a portrayer and delineator. He, moreover, draws much of his inspiration from his love of Scotland and of Scottish romantic and religious history. His novels, *The Raiders* and *The Men of the Moss-Hags*, admirably recreate the era of the Covenanters and their martyrdom for their stern faith. The first novel to bring Mr. Crockett fame was *The Stickit Minister*, published in 1893. Since then he has issued, among other works, *Sweetheart Travelers*, *Cleg Kelly* and *The White Plume of Navarre.* He died in **1915.**

Crocodile, a large, well-known water-reptile covered with bony scales. The tail is long and crested. The name is properly applied to a number of animals living in Asia, Africa, Australia and America. The crocodile of the Nile is the most famous It occurs in nearly all the rivers of Africa. It is said that, owing to the persecutions of travelers, it is greatly reduced in numbers in the lower Nile, but it still is very abundant above the first cataract. This reptile is ordinarily 12 or 13 feet long; exceptional sizes are 18 and 20 feet in length. It seizes cattle and antelopes by the nose while drinking, and draws them into the water. Crocodiles devour dogs when they can catch them, and occasionally a child falls victim to the crocodile, but they rarely attack adults. On the whole they seem to prefer putrid flesh. They leave the water to bask on the mud-banks of rivers and marshes, and here they lay their eggs. From 20 to 60 eggs are inclosed in holes in the sand or mud, and left to be hatched by the heat of the sun. Associated with the crocodile is a bird, called the Nile-bird, that enters the mouth of the reptile while it is held open, and picks the leeches from the tongue and walls of the mouth-cavity. The gavials of India with long slender snouts belong to the crocodile group. The American crocodiles, living principally in South America and the West Indies, are now occasionally captured in Central America and the marshes of southern Florida. See ALLIGATOR.



CROCODILE

Cro'cus. A genus of the iris family, some of which are the earliest spring-flowers, but some bloom in the fall. The genus contains about 70 recognized species, and is native to southern Europe and southwestern Asia. The grass-like leaves and long tubular showy flowers rise directly from a subterranean corm. Numerous varieties are in cultivation.

Crœsus (*krē'sŭs*), king of Lydia, in Asia Minor, came to the throne about 568 B. C., when he was about 35 years old. The Greek cities of Asia Minor fell before his armies. He became wealthier than any ruler whom the Greeks knew, and "as rich as Crœsus" became a common saying. Solon, the Greek sage, once visited him. The king displayed all his treasures, and then asked the wise Greek who was the happiest man he had ever known. "Tellus of Athens," was the answer; "for he lived while his country was prosperous; he was surrounded with children and children's children, who were both beautiful and good; and he died upon the field of battle after having gained a gallant victory over the enemy." "And further," said Solon, "no man can be fully happy until a happy death has closed a happy life." And, in truth, Crœsus' wealth did not save him from misfortune. A son of whom he was very fond was accidentally killed in a boar-hunt. News came, too, that the Persian Cyrus, who had conquered right and left, had cast a longing eye on Lydia. Not knowing what to do, Crœsus asked advice of the famous oracle of Delphi. Said the oracle: "If Crœsus goes to war, he will destroy a mighty empire." What could be plainer? So off goes Crœsus, to be badly whipped by Cyrus, and to find that the empire he was to destroy was his own. When Sardis, his capital, was stormed, the king, careless of life, was about to be slain, when another son, who had been born dumb, scared into speech, told the Persian soldiers that it was the king, and he was kept for a worse death. Placed on a huge funeral-pyre, he watched the flames licking their way upward to their victim, and, thinking of what Solon had said about a happy death, he kept crying out: "O Solon! Solon!" Cyrus chanced to hear him, and, asking what he meant, was told the sage's warning, which made such an impression on him that Crœsus was rescued from the pyre, and became the conqueror's friend and guardian of his son and heir, Cambyses.

Croly, Jane Cunningham, American writer, known better by her pen-name of Jennie June, was born in Leicestershire, England, in 1831, and settled with her family, ten years later, at Poughkeepsie, N. Y. In 1857 she married D. G. Croly, a journalist, who died in 1889. From 1860 to 1887 she was editor of *Demorest's Magazine*, founded the Sorosis society, and took part in progressive movements on behalf of women. Subsequently she was elected to the chair of literature and journalism in Rutgers College and president of the New York City Women's Press club. Her books consist of a *History of Sorosis* and of the woman's club movement in America; *Talks on Women's Topics; For Better or Worse; Thrown upon Her Own Resources*, etc. She died on Dec. 23, 1901.

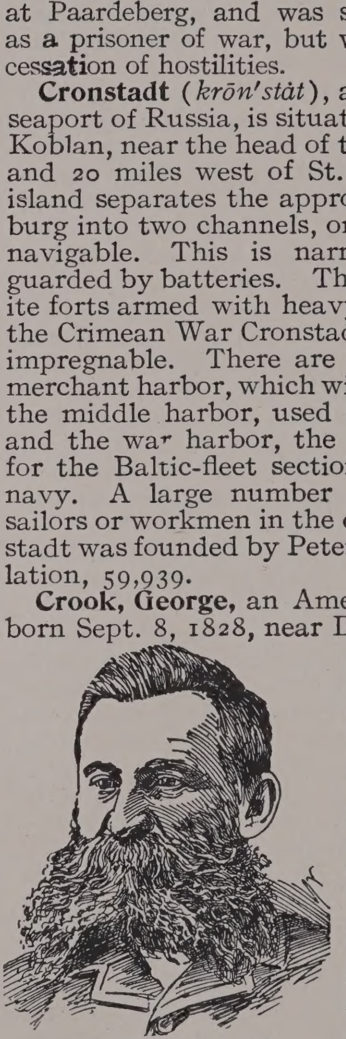
Cromer, Evelyn Baring, first **Earl of,** was born in Cromer Hall, Norfolk, on Feb. 26, 1841, and educated at the Royal Military Academy at Woolwich. He entered the Royal Artillery in 1858, and became captain in 1870 and major in 1876. After service in the colonies he was made private secretary to Lord Northbrook, while he was viceroy of India, from 1872 to 1876. He was commissioner of the Egyptian public debt in 1877-9, controller-general in Egypt, 1879, financial member of council of governor-general of India, 1880, and minister plenipotentiary, agent and consul-general in Egypt, 1883-1906. He was created baron in 1892, viscount in 1898 and earl in 1901, and was a privy councillor and a member of many orders of merit. He wrote several military works, paraphrases and translations from the Greek and a history of his Egyptian proconsulship. He virtually was king of Egypt, and his work there was constructive statesmanship of the highest order. Egypt under him almost became another land. He died in 1917.

Cromp'ton, Samuel, was born at Firwood, Lancashire, England, Dec. 3, 1753, of poor parents. He educated himself, at the same time working as a cotton-spinner and playing the violin at the theater in the next town. In 1779 his spinning-mule was finished, after five years' labor, working at it even late at night. It spun yarn so wonderfully fine that his house was beset by persons eager to know the secret. Ladders were placed at the windows, and in almost every way the inquisitive tried to see it. He could not leave the house for fear his discovery would be stolen. All his savings had gone into the machine, and he had not a farthing left to secure a patent. In his misery he made known the working of the invention to a few manufacturers; from some he never got a cent, and in all he received but a beggarly $300. He managed, however, to start in business with the aid of friends, at first employing his own family as hands; but he was 60 years old before he received any return, when Parliament granted him $25,000. His mule came into use at once, and in 1811 there were in England 4,600,000 of them. He died near Bolton, England, June 26, 1827.

Cromwell (*krŏm'wĕl*), **Oliver,** Lord-Protector of the English Commonwealth and one of the most remarkable characters in English history, was born at Huntingdon, England, April 25, 1599. Little is known of his early life, except that he went to Cambridge. He had, however, but a short time for study, his father dying soon after he entered college, and he returned home to manage the family affairs. In 1628 he entered Parliament. When all hope of a reconciliation between Charles I and Parliament failed, Cromwell was among the first to offer to aid the state in defending its rights. He moved in Parliament for permission to raise two companies of volunteers, having been careful to supply the necessary arms beforehand at his own cost. He soon showed his wonderful military genius. He commanded the right wing of the Parliamentary army at Naseby (June, 1645), where the king's forces were utterly routed. Charles, in May, 1646, escaped in disguise, and surrendered himself to the Scottish army at Newark, by whom he was handed to the commissioners of Parliament. In January, 1649, the king was tried, condemned and executed. Cromwell was a prominent member of the new council of state. He crushed the rebellion in Ireland and in Scotland, and soon became the leading man in England. He dissolved the Long Parliament in 1653, and summoned a new one. The work of this parliament, which was dissolved in five months, gave Cromwell supreme power and the title of lord-protector. Cromwell repeatedly called and dismissed parliaments because he wanted the people themselves to govern and also wanted his government to be strictly constitutional, but his government was just and liberal toward the people and the country prospered under his rule. He died at Whitehall London, Sept. 3, 1658.

Cronje (*krôn'yĕ*), **Piet,** a Boer commander in the war with Britain (1899-1901), was born in South Africa about 1835. He was a member of the Transvaal executive council, under President Paul Kruger, and in the raid of Jameson and his Uitlanders, in January, 1896, he brought about their surrender. He defeated Lord Methuen at Magersfontein, but afterward surrendered to Lord Roberts at Paardeberg, and was sent to St. Helena as a prisoner of war, but was released on the cessation of hostilities.

Cronstadt (*krōn'stȧt*), a strongly fortified seaport of Russia, is situated on the island of Koblan, near the head of the Gulf of Finland and 20 miles west of St. Petersburg. The island separates the approach to St. Petersburg into two channels, only one of which is navigable. This is narrow and strongly guarded by batteries. There are seven granite forts armed with heavy guns, and during the Crimean War Cronstadt was held to be impregnable. There are three harbors: the merchant harbor, which will hold 1,000 ships; the middle harbor, used for fitting vessels; and the war harbor, the regular anchorage for the Baltic-fleet section of the Russian navy. A large number of the people are sailors or workmen in the dock-yards. Cronstadt was founded by Peter the Great. Population, 59,939.



GENERAL CROOK

Crook, George, an American general, was born Sept. 8, 1828, near Dayton, Ohio. He graduated at West Point in 1852, and served on the frontier till the breaking out of the Civil War, in which he served with distinction, commanding a corps of Sheridan's army at the battles of Winchester, Opequan Creek and Cedar Creek. After the war he commanded in the west, becoming brigadier-general in 1873. His campaigns against the Pi Utes in 1872 and the Apaches in 1875 were ably fought. In 1882 he drove the Mormons and squatters from Indian lands, and brought the hostile Chiricahuas to terms. He was also concerned for the welfare of his Indian charges, among other reforms forcing the contractors to pay the Indians in cash for supplies instead of with store-orders. Under his management the tribes quickly became self-supporting. He died at Chicago on March 21, 1890

Crookes, Sir William, an eminent English chemist and electrician, was born at London in 1832 and educated at the Royal College of Chemistry. In 1855 he became professor of chemistry at the Science Training College at Chester; in 1859 founded *The Chemical News;* and in 1864 became editor of the *Quarterly Journal of Science.* Subsequently he became a member of the council of the Royal Society, vice-president of the Chemical Society and prize-winner and gold-medalist of the French *Académie des Sciences.* His researches in physics and chemistry led in 1861 to his discovery of the metal thallium; of the sodium amalgam process for separating gold and silver from their ores; of other important discoveries in molecular physics and radiant matter; and to the invention of the radiometer and the otheoscope. In 1871 he published *Select Methods in Chemical Analysis;* subsequently *The Manufacture of Beet-Root Sugar in England; Handbook of Dyeing and Calico-Printing; Treatise on Metallurgy;* Wagner's *Chemical Technology;* Auerbach's *Anthracen and Its Derivatives;* Ville's *Artificial Manures;* with *The Profitable Disposal of Sewage* and *The Wheat Problem.* The latter consisted of an address delivered before the British Association in 1898. Dealing with physical research and the wheat problem, it created much interest and discussion. He was an authority on sanitation, and studied spiritualism scientifically.

Croquet, a popular outdoor game, played on a grass lawn or levelled dirt-court under given rules. These rules, if adhered to and followed, and where the player is skilled in checkmating his own and his party's opponent, make a match well-nigh as interesting as a game of billiards, especially if all the players, who may be two or eight in number, are experts. The players, who are each furnished with a mallet and ball, are divided into pairs of partners, each playing alternately, the contest or feature of the game being to get one's ball from the starting point (the near stake), first through the various hoops (usually from 6 to 10 in number) placed upright in the ground in a defined order, to the farthest stake or goal, and back again.

Cross, Mrs. (Marian Evans). See ELIOT, GEORGE.

Cross, Mrs. George Frederick (Ada Cambridge), the novelist, was born at St. Germains, Norfolk, Nov. 21, 1844. Upon her marriage to the Rev. Mr. Cross in 1870 she sailed for Victoria, her home, with a sojourn in various bush-districts, until she settled at Williamstown in 1893. Mrs. Cross's published works include 15 or more volumes, from *My Guardian* (1877) to *Thirty Years in Australia.* (1903)

Cross-Pollina'tion (in plants), the transfer of pollen from the stamen to the stigma of another flower. See POLLINATION.

Cross, Southern, one of the star-groups in the southern heavens. Its right ascension is approximately 12 hours: its declination 60° south. The four main stars form a rough cross. It has been invisible from north of the latitude of Alexandria, Egypt, for 18 centuries. The Portuguese explorers of Africa about 1450 were the first modern Europeans to see it.

Crow, a bird of black plumage, belonging to the *Corvidæ* family, which includes jackdaws, ravens, rooks, bluejays and magpies. It is very extensive, embracing some 200 species, and its representatives are found in all parts of the world, except New Zealand, and sparingly in the Australian region. Six members of the family live in the eastern United States. The common American crow is abundant, is distributed generally in this country, and remains with us the entire year. In the winter crows assemble in great numbers in rookeries or crow-roosts. There are a number of these roosting-places in various parts of the country; the one on the Potomac near Washington is well-known. The number that assemble there at one time has been estimated at 40,000. The crows are usually considered to be destructive birds, but they do more good than harm. They injure cornfields to a considerable degree, but they also destroy many cutworms, beetles, grasshoppers, tent-caterpillars and other injurious insects, and thereby compensate for their own misdeeds. They also kill field-mice, rabbits and other rodents, follow the plow in the early spring, and eat the larvæ, field-mice and worms in the furrows. These wily birds soon lose all fear of the farmer's scarecrow, but remain suspicious of bits of bright tin swinging from cords stretched across a field, and they will not go near corn that has been dipped in tar. The birds are models of family affection; the male feeds his mate while she is on the nest, broods the eggs when she is absent, and stands guard with untiring zeal; and both parents long keep watch over their young.

Crozier, John B., born in Ontario and educated at Galt and the University of Toronto, graduating in 1872. Soon after, he went to London, England, and commenced the practice of medicine. In 1880 appeared his *Religion of the Future,* a work of merit. In 1885 his *History of Intellectual Development* followed, and in 1887 he published *Lord Randolph Churchill.* His *Civilization and Progress* has reached a third edition.

Cruikshank (*kro͝ok'shănk*), **George,** an English cartoon-etcher, was born at London, Sept. 27, 1792. His father and elder brother were caricaturists. He thought of becoming an actor; but a publisher who saw some of his sketches talked him into illustrating children's books and songs. But he soon found that his genius lay in cartoons. His finest etchings, perhaps, were those in *Peter Schlemihl*, Grimm's *German Popular Stories* and Dickens' *Oliver Twist*. His powerful series of *The Bottle* showed the evils of drunkenness in a strong light. He died on Feb. 1, 1878.

Crusades, The (from Portuguese *cruzado*, "marked with the cross"), is the name given to the religious wars carried on during the middle ages between the Christian nations of western Europe and the Mohammedans. The first of the crusades was undertaken (1096-9) to uphold the right of pilgrims to visit the Holy Sepulcher at Jerusalem. The Arabs had generously allowed the pilgrims, who came in thousands, not only to visit the sepulcher but to build a church and hospital in the city. In 1065 the Seljuk Turks conquered the country. At once the pilgrims were molested and treated with cruelty. Peter the Hermit, a Frenchman, who had himself made a pilgrimage and had witnessed the cruelties of the Turks, with the pope's sanction (1095) wandered over Europe, preaching everywhere to crowds in the open air, telling how Christians were beaten, robbed and murdered. Europe was roused from end to end. At a council, held at Clermont, France, to consider the matter, the pope's speech was interrupted by cries of "God wills it!" This became the war-cry of the enterprise; the badge worn was the cross, from which came the name crusade.

The following, in brief, comprises the annals of the various crusades: First, four rabble hordes went forth, viz., 20,000 under Walter the Penniless, followed by 40,000 under Peter the Hermit, who were badly cut to pieces in Bulgaria and the survivors utterly overthrown by the Turks at Nicæa; then issued 15,000 Germans who were scattered and slaughtered in Hungary, which also proved the grave of 200,000 poor wretches from England, France, Flanders and Lorraine. But soon came six armies of real crusaders under Godfrey of Bouillon, Robert, Duke of Normandy and others, accompanied by Tancred, the hero of the crusade; in all some 600,000. The sultan's capital, Nicæa, fell in 1097. Next Edessa, and then Antioch after a fearful siege of seven months, the Christian army melting away from famine, sickness and desertion. Two hundred thousand Seljuks now besieged the westerners. When they were routed, only 400,000 men were left to march on Jerusalem. The city fell; Godfrey of Bouillon was chosen king; soon all Palestine came into his hands; and for 50 years the crusaders held the principalities of Edessa, Antioch and Jerusalem. At Jerusalem were founded the two famous orders of the Knights Hospitalers of St. John and the Knights Templars.

In 1144 Edessa was conquered and the Christians slaughtered. A second crusade, preached by the famous St. Bernard, was led in 1147 by Conrad III of Germany and Louis VII of France. About 1,200,000 soldiers marched under them, only to be defeated, Conrad's army, by the treachery of the Greek emperor, near Iconium, and Louis' army in the Pisidian Mountains.

The deathblow to the kingdom of Jerusalem came from a young Kurdish chief, who had made himself sultan of Egypt and sought to become sovereign of all the Moslems—the famous Saladin. His conquest of Jerusalem (1187) gave rise to the third crusade, led by Philippe Auguste, king of France and Richard the Lion-heart, king of England. Acre was attacked (1190), and 23 months later it surrendered. But the leaders quarreled, Philippe went back to France, and Richard, after performing prodigies of valor, which excited the admiration of the Saracens, made a treaty with Saladin (1192), by which the people of the west were to be at liberty to make pilgrimages to Jerusalem without being taxed. The fourth crusade (1203) never went near Palestine, but founded the Latin Empire of Constantinople, which lasted 56 years.

One of the strangest happenings in history is the children's crusade, which took place in 1212. An army of French children, 30,000 strong, headed by a peasant-boy named Stephen, set out for the Holy Land by way of Marseilles. A like army of German children, 20,000 strong, led by a boy named Nicholas, crossed the Alps at Mont Cenis. A second army of German children, numbering nearly 20,000, crossed the Alps by a more easterly route, touching the sea at Brindisi. Their idea was that the Mediterranean would open a path for them to Palestine and that Jerusalem would be recovered and the Moslems made Christians by miracles. Some of the children became discouraged and returned to their homes, many stopped by the way, but most of them either perished on the march, or were lost at sea or sold into slavery.

The fifth crusade (1228) made Frederick II of Germany and Sicily, king of Jerusalem. In 1244 a new horde of Turks made themselves masters of Jerusalem. A sixth crusade (1249) followed, led by Louis IX of France, against Egypt, now held to be the key to Palestine. Louis was taken prisoner, and had to pay a heavy ransom. The seventh crusade (1270) was led by him and by Prince Edward, afterward Edward I of England. Nothing was accomplished by this adventure, however. Acre, Antioch, and Tripoli were held by the Templars and other knights for some time; but Acre, followed by the others, surrendered in 1291.

Crustacea (*krŭs-tā'shē-ȧ*), the name of a class of animals embracing the shrimps, prawns, crayfish, lobsters and a number of minute forms called water-fleas. They belong to a larger group or subkingdom (*Ar-*

thropoda) which, besides the crustacea, includes the insects, myriapods and spiders. These four are all *classes* of the great subkingdom *Arthropoda,* and therefore are equivalent groups. The crustacea pass through a metamorphosis, hatching from the egg in a different condition from the adult. Most of them live in the water and breathe by gills, but there are some terrestrial forms, like the pill-bug, which is to be found in dark places, under boards, under bark, in cellars. Some of the minute forms, called water-fleas, carry their eggs in cases attached to the body.

Cryptogam (*krĭp'tō-găm*), a name applied to all those plants which do not produce seeds, including therefore *Pteridophytes* (ferns and their allies), *Bryophytes* (mosses and their allies), and *Thallophytes* (*Algae* and *Fungi*). The name was given because it was believed at that time that the sexual reproduction of these plants was hidden, as the stamens and pistils of flowering plants were then falsely thought to be sex-organs. The fact is, however, that the sexual reproduction is more direct and evident in *Cryptogams* than in the *Spermatophytes* (seed-plants), which were called *Phanerogams,* meaning "evident sexual reproduction." The name *Cryptogam* still affords a convenient title for classification, however. As the *Pteridophytes* have woody vessels they are often called vascular *Cryptogams* to distinguish them from *Bryophytes* and *Thallophytes* which are not vascular.

Crystallography, the science of crystallization, which treats of the systems of forms among crystals, their structure, and forms of aggregation. A crystal is composed of inorganic matter, with a definite molecular structure, and regularly shaped by solidification into a form bounded by plane surfaces called "crystal faces." The minute particles, called "crystal molecules" attract each other as a magnet attracts iron. Crystal molecules of different substances have different lines of attraction, of varying intensity. Therefore, usually, the solid formed by the attraction of the crystal molecules of a certain chemical compound for each other, takes an outward shape characteristic of that compound. Only elementary substances and definite chemical compounds crystallize. The simplest process of crystallization is evaporation of a solution until it is supersaturated, when crystals will form. The crystal faces have a symmetrical recurrence corresponding to the lines of attraction of the crystal molecules. Although the crystal forms are innumerable, they can be classed under six crystallographic systems.

The *isometric system* includes crystals having three equal axes at right angles, as the regular octahedron. This group gives the highest possible symmetry. The *tetragonal system* is also based on three equal axes at right angles but only the two lateral axes are equal, as in the right square prism. The *hexagonal system* has three equal lateral axes intersecting at angles of sixty degrees, and a vertical axis of variable length at right angles, as in the hexagonal prism. The *orthorhombic system* includes crystals with three unequal axes at right angles, as in the right rhombic prism. The *monoclinic system* is also distinguished by three unequal axes, with one oblique intersection, as in the oblique rhombic prism. The *triclinic system* has three unequal axes and intersections oblique as in the oblique rhomboidal prism.

Cuba (*kū'bȧ*), the "Pearl of the Antilles," is a republic consisting of Cuba, the largest island of the West Indies, the Isle of Pines and the small adjacent islands. It is situated at the entrance to the Gulf of Mexico between the Strait of Florida and the Caribbean Sea. The Windward Passage, fifty miles wide, separates it from Haiti to the east. The British island of Jamaica lies eighty-five miles to the south, and Yucatan 130 miles to the west. Key West, Florida, is about 100 miles northeast of Havana, Cuba. The island of Cuba is 730 miles long with a maximum breadth of 160 miles and an average breadth of fifty miles. The Republic extends over an area of 44,164 square miles, 41,634 square miles of which are comprised in the island of Cuba.

Surface. The coast line is irregular, and is about 2,500 miles in length, including the larger keys. There are many safe, excellent harbors, that of Havana being one of the largest and finest in the world. Other excellent harbors are Bahia Honda, Matanzas, Cardenas, Nuevitas and Nipe on the northern shore, and Santiago and Cienfuegos on the southern shore. Guantanamo Bay is also a safe and commodious harbor. With Bahia Honda it was leased to the United States on July 2, 1903, for an annual rental of $2,000 and has since been maintained as a naval base. A continuous belt of plantations is situated near the coast, and broad intervals of low uplands are frequent throughout the island. There are mountains in Pinar del Rio Province in the west, and the provinces of Camaguey and Oriente in the east where they rise to an average height of 3,000 feet. The highest peak is Monte Turquino, which reaches an elevation of 8,320 feet. The topography of Santa Clara Province is rough and broken, but flat, rolling land lies in Matanzas and Havana. Uplands and mountains are magnificently wooded and afford beautiful, wild scenery. The lower slopes are covered with grazing and farm lands. Tobacco plantations flourish on the southern slopes. Mineral springs are common, and there are numerous caverns filled with beautiful stalactites. The vegetation is tropical, with trees of colder climates in the lowlands.

Climate. The climate is equable in the coastal regions, and the temperature does not differ greatly from that of Florida. In Havana, the mean temperature is seventy-six degrees. Frost is unknown. There is no month free from rainfall, which is excessive in Cuba. The mean rainfall at Havana is 40.6 inches. Earthquakes are frequent in the east. The stormiest months are in the autumn. As Cuba lies in the path of the hurricanes, there is scarcely a decade that passes without some destruction being wrought. In 1846 a hurricane destroyed 216 vessels and 1,872 homes.

Minerals. There are rich mineral deposits in Cuba, especially of iron ore. The reserves in this ore are estimated at 3,221,000,000 tons. Although iron ore was mined extensively in 1884, Cuba exported in 1930 only 25,001 tons. There were 21,950 short tons of copper produced in 1932; 2,148 tons of manganese exported in 1930. Gold, asphalt, and lead are also found in Cuba. There are six salt deposits, which yield about 50,000 tons annually. The island has very little coal.

Production and Industry. In natural resources Cuba is by far the richest of the Antilles, and is able to support over 15,000,000 people. The soil is exceptionally rich and easily worked. There are 3,350 native plants, and the virgin forests contain immense quantities of many valuable kinds of trees. It is officially estimated that dense forests cover 8,628,438 acres of land. The royal palm often rises to a height of between seventy-five and 100 feet. Mahogany and other valuable cabinet woods are produced. Much cedar is used in the manufacture of cigar boxes. There is an abundance of dye-woods, gums and resins on the island.

Political oppression and unfavorable labor conditions have retarded agricultural development, and industrial growth has been hampered by the very small amount of coal, known oil deposits, and limited hydro-electric resources.

Sugar is the most important crop of Cuba. Approximately 1,600,000 acres are planted in cane sugar. The high prices in 1920 which followed the World War, and the further rise of price in 1923, stimulated excessive production. There were 183 sugar mills grinding in 1925, and Cuba's share of the world production of sugar was twenty-one per cent. In 1932 there were but 133 mills grinding, and Cuba's share in world production had fallen to less than ten per cent. Cuba had supplied the United States with fifty-eight per cent of its sugar consumption in 1926, but the production of beet and cane sugar in the United States, and its purchases from Puerto Rico, Hawaii and the Philippines, decreased the Cuban percentage to twenty-eight in 1932. The crop totalled 5,125,000 long tons in 1925, and but 2,603,000 long tons in 1932. Following an international agreement on sugar stabilization in 1930, Cuba by presidential decree withheld 1,317,514 long tons of the 1930 crop, one-fifth of which was liquidated in 1931, and the rest to be sold in equal parts over four years' time. The sugar crops of 1930 and 1931 have both been sold at prices fully fifteen per cent below production costs.

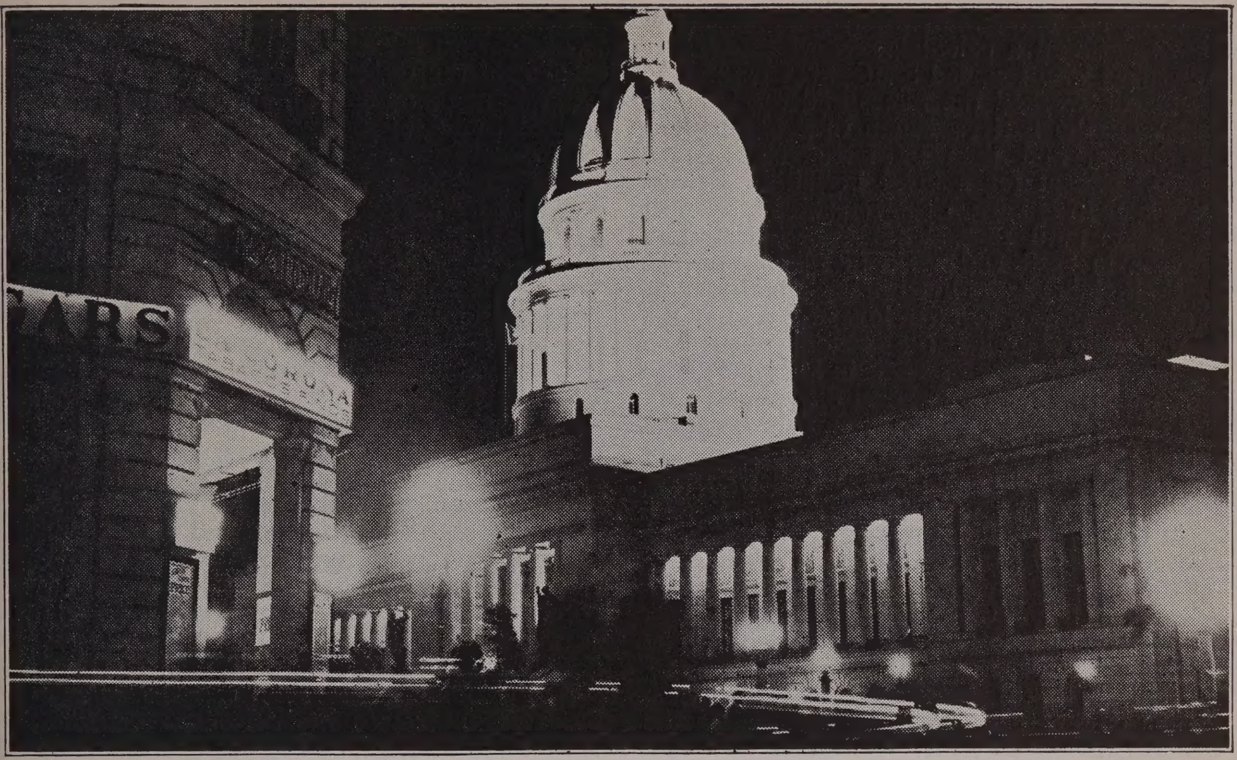
The second great Cuban industry is the raising of tobacco and the manufacture of cigars. The economic depression has also severely affected this industry. The tobacco crop fell from 82,118,000 pounds in 1930-31 to 80,707,000 pounds in 1931-32, and then dropped abruptly to 34,693,000 pounds in 1932-33. Exports of leaf tobacco to the United States fell from 21,773,000 pounds in 1930 to 13,048,000 pounds in 1932.

In its effort to overcome the centuries-old Cuban tendency to raise cash crops for export, and import foodstuffs, the government has since 1924 made strenuous efforts to secure agricultural diversion and stimulate industry. Seeds have been supplied free to rural communities, and fleets of trucks provided to collect milk and country produce for the city markets. In 1931 there were 100,018 milk cows, and 4,290 dairy farms employing 10,137 persons. Importation of thirteen foods from the United States has decreased yearly from a $43,800,000 value in 1925 to only $9,930,000 value in 1931. As a part of this campaign, coffee production has been encouraged. In 1928 there were 582,000 pounds of coffee exported and in 1932 there were 13,157,059 pounds. The United States imported sixty-eight per cent of this supply. Fruits, especially bananas, and vegetables are also being raised for export. Cacao, cereals, potatoes, and sisal are other important products.

In March negotiations were begun for a new trade pact with the United States. The Cuban-American treaty of 1902 is in need of revision. It was announced in Havana on March 20, by Secretary of State, Cosme de la Torriente, that the new treaty would be ready to submit to the Seventy-Third Congress in April. Martinez Saenz, Secretary of the Treasury, has been in Washington to conclude the negotiations. It is expected that the treaty will be of especial benefit to Cuban sugar, tobacco, and alcohols. Other Cuban exports which will be benefited by the treaty are preserves, fruits, vegetables, sponges, precious woods (mahogany and cedar), iron, manganese, asphalt, chromium and copper. A $10,000,000 loan has been arranged which Cuba will employ in the purchase of silver from the United States to be used in the coinage of 20,000,000 Cuban pesos and to finance public works projects in Cuba. The treaty also authorized the American Export-Import Bank, a new institution, to grant a credit of $25,000,000 to Cuban merchants for the purpose of financing the purchase of American products. In negotiating for the treaty Cuba sought preferential treatment and an increased quota of sugar.

The American demand in the pact was for an increased market in Cuba for American manufactured products such as machinery, textiles, raw cotton, cotton, rayon and silk goods, pork and its products and canned goods. Substantial tariff reductions, it is reported, will be received by the United States.

Transportation. In 1929 there were 3,057 miles of railway in Cuba, 1,393 miles of which were included in the United Railways of Havana and 778 miles in the Cuban Railways. The large sugar estates are connected by private lines with the main railways. Overseas trade vessels clearing Cuban ports in 1930 numbered 5,543, and coast vessels totalled 8,295. In 1930 there were 1,990 miles of Government highways, 846 miles of which were first-class. The



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THE CAPITOL BUILDING IN HAVANA

great Central Highway, opened on February 24, 1931, extends for 706 miles from Pinar del Rio to Santiago. It is a concrete road 20.66 feet wide, without grade crossings, and constructed at a cost of $101,123,000. Air mail service between Cuba and Mexico, and Cuba and New York was established in 1930. An efficient air service is in operation within Cuba.

Population. The population of Cuba, according to the census of 1930, is 3,763,375, exclusive of the Isle of Pines, which has a population of 4,817. Of this number, 2,570,102 are whites (Spanish and Creoles); 923,346 are colored (Negroes and Mulattoes); and 269,927 are unclassified, including Americans, Europeans, Chinese and all foreigners residing permanently in Cuba. This census excluded from its total 63,478 tourists and 12,219 immigrants.

Among Cuba's important cities, with their populations in 1930, are Havana, the capital, 584,893; Santiago, 143,446; Camaguey, 84,825; Cienfuegos, 76,951, and Matanzas, 65,413.

Education. A system of free compulsory primary and secondary schools was established by the Education Act of 1899. An extensive system of kindergarten and night schools has since been added. In 1931-32 there were 3,816 public schools with 7,573 teachers and 434,279 pupils, and 364 private schools with 26,622 pupils. In each province a special institute of advanced education and normal schools for the training of teachers are maintained by the Government. Near Havana there is a special school modelled after the English public schools, with a teaching staff drawn from them. The University of Havana was founded on September 12, 1721. In 1930 it had 4,795 students, of whom 2,303 were studying medicine, and twenty-two per cent were women. The University was closed by presidential decree in 1931 because the students participated in the political disorders of the time. The Roman Catholic religion is dominant on the island.

Government. Cuba, declared an independent State by the Treaty of Paris on December 10, 1898, had a government modelled after that of the United States. Its Constitution, adopted on February 21, 1901, was amended in 1928. This government was overthrown in 1933.

A Provisional Constitution for Cuba was adopted on February 4, which guarantees personal rights, freedom of press, habeas corpus, free assembly, and grants full woman suffrage. Provision is also made for the election of delegates to a Constituent Assembly which is to be held before December 31, 1934. Since September 14, 1933, on which date Grau San Martin abrogated the Constitution of 1901, Cuba has been without an organic law. A notable feature of the Provisional Constitution is its elimination of the death penalty. It was this provision which resulted in violent outbursts of protest from the student group on February 5. Police authorities suppressed the uprising.

History. Columbus discovered the island of Cuba on October 28, 1492. He called it "the most beautiful land that eyes ever beheld." In that same year he named it Juana after Juan, son of Ferdinand and Isabella. It later became known successively as Fernandina, Santiago, and Ave Maria, but the aboriginal name of Cuba could not be eradicated and finally prevailed over all the others. In 1511 Columbus's son Diego outfitted a colonizing expedition under Velasquez who founded Santiago in 1514. The Spaniards worked the mines and the land by enslaving the natives whom they almost exterminated, and then by introducing negro slaves. Except for a brief period of British occupancy in 1762-63, Cuba remained a Spanish possession until 1898. The French destroyed Havana in 1538, and again in 1554. For 150 years the inhabitants lived in continual fear of French, Dutch or English invasion, and of the pirates who harried the waters about the islands. The Treaty of Paris in 1763 ended the Seven Years' War, and from that time Spain was ruling Cuba by means of captain-generals. There were many rebellions to their tyrannical rule, the most important of which were the Black Eagle revolt in 1830, the Ten Years' War from 1867-77, and the insurrection of 1895. The United States had tried a number of times to purchase Cuba, and also to secure her independence. During the war which began in 1895, the United States repeatedly protested against Spanish atrocities in Cuba. The destruction of the United States ship *Maine* in the Havana harbor on February 18, 1898, resulted in the Spanish-American War. This conflict ended in the Treaty of Paris, on December 10, 1898. Cuba was released from Spanish rule and granted independence. The slaves had been freed in 1878.

The United States set up a military occupation of the island which continued until May 20, 1902. During this time, the United States established order, organized civil and municipal governments, established schools, and provided for a convention of the people, under which a constitution was formed and adopted on February 21, 1901. Cuba became a republic and Tomas Estrada Palma was elected the first president. He was re-elected in 1906. Gross frauds were charged against him during his second term and revolution swept the island. President Palma called upon the United States to intervene as provided by treaty, resigned his office, and the United States again resumed temporary jurisdiction with a provisional government. A new election in 1908 declared General Gomez President of Cuba. American troops were withdrawn on January 28, 1909.

On April 7, 1917, Cuba declared war against the Central Allies, and seized four large German ships in her harbors on August 21, transferring them to the United States. In 1919 a new electoral code was adopted under the advice of General Enoch H. Crowder, who was sent again by President Wilson in 1920 when a political crisis threatened. In 1920-21, Cuba suffered a great financial depression. The American marines were removed from the island in January, 1922, but General Crowder remained to establish a new civil service law, to improve the accounting system, and to construct a $50,000,000 loan, approved by the United States in accord with the Platt Amendment of 1901.

A threatened national crisis in 1924 was averted when the United States War Department sold the Cuban government large stores of arms and ammunition. In March, 1925, the United States by treaty relinquished the Isle of Pines to Cuba. In September, 1927, Cuba was elected to a non-permanent seat on the League of Nations Council.

General Machado was elected President of Cuba by a large plurality in November, 1924. Under the constitutional amendment, he was nominated by a coalition of three political parties and chosen without opposition in November, 1928, for the term ending in 1935. He was inaugurated in the new capital at Havana. Acute economic depression very nearly produced a revolt against his government in 1930. He was obliged to contend with violent political opposition and armed rebellion for the next three years. Although he offered constitutional reforms on June 7, 1933, he continued his military rule. A general strike beginning on August 3, grew into a rebellion against Machado. Firing upon a crowd gathered at the Palace to cheer because of a false report that he had resigned, brought violent rioting. On August 11, the army possessed the forts and demanded Machado's resignation. He was granted a leave of absence by Congress and went by plane to Nassau in the Bahamas. The Secretary of State became Provisional President. He dissolved Congress, voiding the constitutional reforms of 1928, removing the Supreme Court and promising new elections. On September 5, however, the army revolted, overthrew his government and established a junta of five intellectuals. Five days later, the Junta declared one of its number Provisional President, and Dr. Ramon Grau San Martin, supported by the students' directorate, assumed control of the country.

The revolutionary government of Grau San Martin which gave rise to increasing dissension and conflict in Cuba during the last quarter of 1933, gave way to a new government under President Mendieta on January 15. The Grau government had been dominated almost completely by Dr. Antonio Guiteras, Minister of War and the Interior. His radical policies were extended to various industries and enterprises. Labor was incited to open opposition. On January 14, the Cuban Electric Company was forced to submit to State supervision because of its failure to meet the demands of Labor. The Grau government refused to pay interest, amounting to $4,000,000, on loans contracted during the Machado régime. One of the most important edicts of the Grau régime was that by which all government lands and those belonging to officials and followers of the Machado government were seized. Such land was to be exempt from taxes for a two-year period. It was not to be sold or disposed of in any way, but was to remain under the supervision of the Department of Agriculture. The land was to be divided up among landless tenants and workers.

A measure which tended only to create further strife provided that at least one-half of the workers in any enterprise in Cuba must be Cubans. This was especially obnoxious to Spanish and American inhabitants of Cuba. Dissatisfaction with the Grau government steadily increased. Ramon Grau San Martin found the support which he had enjoyed was noticeably weakening. The student support failed him. Colonel Batista, who stood alone in supporting him, gradually lessened that support which was so necessary to the radical President. The collapse of his régime occurred on January 15, following a dispute with Dr. Antonio Guiteras.

The United States had insistently refused recognition of the Grau government. Grau San Martin found open opposition confronting him. Labor, encouraged by Communist leaders, only agitated an already alarming situation. The Menocalistas, the Marianastas and the Nacionalistas, Conservative groups, the ABC and a group of radicals offered their opposition to Grau San Martin. Compromise was impossible. Colonel Batista, desirous of establishing a government which would be recognized by the United States, favored compromise. Guiteras, on the other hand, sought to establish a new government in Cuba by more radical means.

On January 15, the Junta met to dismiss Grau San Martin who had enjoyed a career of four months, from September 5, 1933, to January 15, 1934. The revolutionary government he strove so earnestly to establish was distinctly of Cuban origin which accounts in some measure for the seeming success of that radical movement during the last quarter of 1933. His fall, which he ascribed to the non-recognition policy adopted by the United States, was inevitable. Without American recognition Cuba had to grapple with an economic problem which was insoluble just so long as non-recognition endured. Credit, a trade pact, and reduced tariffs were impossible, all of which were vital points in a program designed for Cuban economic prosperity.

The discord between Colonel Batista and Dr. Guiteras continued and placed a stumbling block in Cuban affairs. A successor to Grau San Martin must be found. Colonel Batista supported Carlos Mendieta for the Presidency, a candidate whom Dr. Guiteras opposed. By way of compromise Carlos Hevia, Secretary of Agriculture in the Grau government, was appointed Provisional President on January 16. He held office for two days. The shrewd Colonel Batista was master of the situation and on January 18, Carlos Mendieta became President of Cuba, the fifth President the Republic has had within the past six months.

In striking contrast to Ramon Grau San Martin, the radical physician, President Mendieta, the sixty-year old veteran, stands acclaimed as Cuba's hero today. He has been accorded strong support, opposed only by the Communists, students of the Left, and a group of radical intellectuals. His opposition is small but powerful. Mendieta was confronted by a complicated state of affairs which demanded immediate remedial action. The Mendieta government was immediately recognized by the United States, a recognition which enabled Mendieta to obtain a $10,000,000 food credit from this country. The island was in dire need of food supplies for its needy. A strike of physicians numbering more than 25,000, which had resulted from Grau San Martin's attempt to create a union of physicians under government supervision, had inflicted extreme suffering upon the people. The strike was effectively ended by a thirty-day truce. Mendieta restored company control to the Cuban Electric Company. This action must soon be followed by a decrease in electric rates if Mendieta is to continue with the support he now enjoys. The new President has yet to meet the demands of Labor, which in Cuba is under the control of Communist leaders. Carlos Mendieta is known throughout Cuba for his honesty. He has organized an efficient, honest, and Conservative Cabinet which can steadily guide Cuba through the reconstruction period.

During the early part of February Cuban Labor resorted to general strikes which resulted in a labor crisis. The government, ably supported by the army commanded by Colonel Batista, succeeded in quelling the outbreaks. President Mendieta issued a manifesto to Cubans in which he emphasized the fact that he would make every effort "to free Cuba from a state of chaos and ruin." He urged the people to co-operate with the government in the "restoration of economic life through the efficient use of their resources and organizations to give an impulse to production and solve the unemployment problem." The sugar industry, tobacco and electric enterprises were crippled by the rebellious workers. A general strike was planned for February 6. Non-strikers were promised and guaranteed the protection of the government's military forces. The strike failed and on February 10, a "social emergency" law was enacted which enabled the State to end all strikes "endangering the nation." Thus was the labor problem effectively handled by the Mendieta government.

See ANTILLES; CIENFUEGOS; GUANTANAMO; HAVANA; MATANZAS; SANTIAGO DE CUBA; SPANISH-AMERICAN WAR; SUGAR; WEST INDIES.

Cuckoo, a bird of the order *Coccygomorphae*, belonging to the large family of *Cuculidae*. It is named from its cry of "coo coo." The common cuckoo, *Cuculus canorus*, is widely distributed, being found in Europe and Asia in the summer, and in Africa and India in the winter time. The cuckoo is arboreal; a shy, restless, and unsocial bird. It is slightly over a foot in length, and has a long slender curved bill, long pointed wings, and a long rounded tail. It is ashen gray above, with transverse brown lines on the whitish body underneath. The cuckoo lays a small egg on the ground, and lifts it in its bill to deposit in the nest of a smaller bird. In this way it distributes its eggs in the nests of other birds. The young cuckoo monopolizes the nest, secures the bulk of the food, and lifts the eggs or young nestlings in the hollow of its back, thrusting them out of the nest. The American cuckoo, *Coccyzus americanus,* makes but a poor nest, lays irregularly, and is indifferent to its young, but only rarely lays in the nests of other birds, as do its European and Asiatic relatives.

Cucumber, a vegetable of the genus *Cucumis,* and a native of Asia. There are about thirty species, chiefly found in Asia and the West Indies. The plant is like a vine, and the fruit, which grows to a length of from four to thirty inches in various species, is eaten green as a salad, or pickled. Although cucumbers require cultivation in a rich warm soil, and are very sensitive to frost, they have been raised from earliest times.

See Gourd.

Culberson, Charles A., an American statesman, was born in Alabama in 1855. His parents removed to Gilmer, Texas, in 1853, and later to Jefferson and to Dallas. Young Charles was given a legal education and after his graduation began the practice of law. In 1890 he became attorney-general of the State of Texas. He later became Governor of his state. In 1899 he was elected United States Senator. He was re-elected in 1905, 1911, and 1917.

Culloden (*kŭl-lŏd'ĕn*), or **Drummossie Moor,** a tract of moorland about five miles east of Inverness, Scotland. It is a broad flat sandstone ridge, from 300 to 500 feet high. Culloden is famous chiefly as the site of the battle which ended the Stuart hopes of regaining the English throne. On April 16, 1746, the Duke of Cumberland, with 12,000 disciplined troops, utterly routed the 5,000 exhausted Highlanders under the young Pretender, Charles Edward, who was forced to go into hiding until he could escape to France. A monumental cairn marks the site of the battle.

See Scotland.

Cullom, Shelby Moore, an American statesman, was born in Wayne County, Kentucky, on November 22, 1829. When he was a small child his parents removed to Illinois. He was educated for the legal profession. He was admitted to the bar and began his practice in 1855 at Springfield, Illinois. He became a leader in politics, and in 1856 was elected to the Illinois legislature, becoming Speaker in 1860. From 1865 to 1871 he represented his district in Congress. In that year he re-entered the Illinois legislature and again became Speaker. In 1872, as a delegate to the Republican Convention, he nominated Grant for the presidency. In 1876 he became Governor of the State of Illinois, and was re-elected in 1880. He resigned this office in 1883 to become a United States Senator. He remained in the Senate for five consecutive terms. He took an active part in railroad legislation. He was the author of the Interstate Commerce Law, and for many years chairman of the Interstate Commerce Commission. Senator Cullom later became chairman of the Committee on Foreign Relations. In 1898 he was appointed one of the commissioners to establish the United States government in Hawaii. In 1913 he was appointed commissioner in charge of the Lincoln Memorial at Washington, D. C., and arranged for the beautiful structure on the Potomac River. He wrote *Fifty Years of Public Service,* summarizing his life work. He died on January 28, 1914.

Culpeper (*kŭl'pĕp-ẽr*) or **Colepeper, Thomas, Lord,** grantee and colonial governor of Virginia, was born in England. The date of his birth is not known, but he first came to public notice in 1669 when he purchased lands in Virginia, lying between the Potomac and the Rappahannock. In 1673, with Lord Arlington, he received from King Charles II a grant of the whole territory of Virginia for a period of thirty-one years. He was appointed governor for life in 1675, and personally ruled in Virgina from 1680 to 1683, administering chiefly for his own gain, and annulling the privilege of appeal of the colonists to the local assembly. In 1683 he withdrew from the office of governor, and in violation of his orders returned to England, where he was convicted of corruption and deprived of his patent. Upon his death in England in 1719, his large estate in Virginia passed to Lady Fairfax, his daughter, related by marriage to George Washington.

Cumberland, a city and the seat of Allegany County, Maryland, is situated on the north bank of the Potomac River at the mouth of Wills Creek. It is 150 miles southeast of Pittsburgh, and forms the western terminus of the Chesapeake and Ohio Canal. It is at the head of Cumberland Road (the Great National Road). The city is in the center of the extensive Cumberland coal-fields. Its many industries include machine and repair shops, foundries, silk and flour mills, and the manufacture of leather, steel, iron, glassware, and cement. In addition to public schools and a high school, an academy is located in Cumberland. The population in 1930 was 37,747.

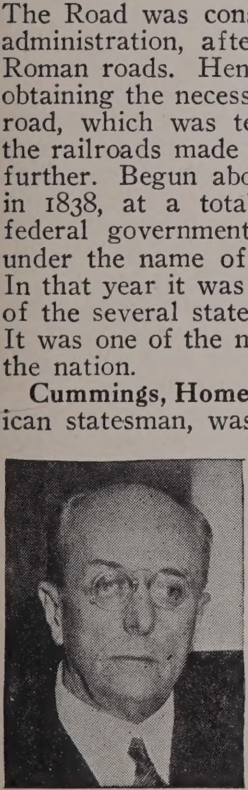
Cumberland, a town in Providence County, Rhode Island, is situated on a branch of the Blackstone River, six miles from Providence City. The hills in the vicinity yield granite and coal. The principal manufactures are cotton, silk, and iron goods. Cumberland is a city of historic importance. The only Cistercian Trappist Monastery in New England is situated here. Nine Men's Misery, a cairn over the graves of nine men killed in an early Indian War, is located in Cumberland as is the grave of William Backstone, the first white settler in Rhode Island. Among the interesting buildings in the city are the Elder Ballou Meeting House, which was built in 1740, and the Catholic Institute Association. In 1930 the population was 10,304.

Cumberland Mountains, the western division of the three main branches of the great Appalachian Mountain, extend along the southwestern border of Virginia and the southeastern border of Kentucky, crossing Tennessee into the northeastern part of Alabama. They form a great plateau which in Alabama becomes the Gulf or coastal plain. The range, which is about fifty miles broad, is composed chiefly of sandstone, limestone and slate, with valuable coal deposits. The highest elevations are in Kentucky and reach 2,500 feet, although the ridges are rarely over 2,000 feet high. The slopes are covered with hardwoods, and drained into the Ohio River by the Cumberland and Tennessee Rivers.

Cumberland River, a river which rises in the Cumberland Mountains in Kentucky. It flows westward into Tennessee and, returning into Kentucky, enters the Ohio River at Smithland after a course of 680 miles. The river basin extends over an area of 18,500 square miles. There is a fall of sixty feet near Williamsburg, Kentucky, known as the Great Shoals. The river, however, is navigable for steamboats for nearly 200 miles. Light craft can ascend as far as Burnside, Kentucky, a distance of 580 miles from the mouth of the river.

Cumberland Road, a famous national highway extending from Baltimore, Maryland, through Cumberland, on through Ohio to Vandalia, Illinois, a total distance of 800 miles. The Road was constructed during Jefferson's administration, after the model of the great Roman roads. Henry Clay was influential in obtaining the necessary funds to construct the road, which was terminated at Vandalia as the railroads made it unnecessary to extend it further. Begun about 1806, it was completed in 1838, at a total cost of $7,000,000. The federal government controlled it until 1856, under the name of the Great National Pike. In that year it was turned over to the control of the several states through which it passed. It was one of the most famous stage roads in the nation.

Cummings, Homer Stille, a prominent American statesman, was born in Chicago, Illinois, on April 30, 1870, the son of Uriah C. and Audie (Schuyler, Cummings. He was educated at Yale graduating in 1891 with the degree of Ph.B. In 1893 he received his LL.B., from that same institution. He was admitted to the bar in that same year and began his practice of law at Stamford, Connecticut. He married Mary Cecilia Waterbury.



H. S. Cummings
Attorney-General

From the very beginning of his career he was active in Democratic affairs. He was a member of the Democratic National Committee from 1900 to 1924, and served as National Chairman during the campaign of 1920. Homer S. Cummings was Mayor of Stamford from 1900 to 1906, and corporation counsel from 1908 to 1912. He was a member of the Connecticut State National Defense in 1917. A brilliant court lawyer, he became State's Attorney for Fairfield County, Connecticut, in 1914, and occupied that position until 1924. His fair, humane methods were never better exemplified than in the famous Israel case, where he made the statement: "It goes without saying that it is just as important for a State's Attorney to use the great powers of his office to protect the innocent as it is to convict the guilty." He was Chairman of the Committee on State Prison Conditions in 1930. With the advent of the Roosevelt Administration in 1933, the President planned to name this able attorney Governor General of the Philippines to succeed Colonel Theodore Roosevelt. Cummings, however, was one of the oldest and closest friends of Senator Thomas J. Walsh, who had asked him to be his chief assistant when he became Attorney General. Senator Walsh died suddenly on March 2, 1933, just two days before the inauguration. President Roosevelt immediately appointed Homer S. Cummings Attorney General.

Cuneiform (*kū-nē'ĭ-fôrm*), a type of writing composed of characters which are shaped like wedges or arrow-heads. There are a number of distinct systems, used by the ancient peoples of Akkad, Babylonia, Assyria, Armenia, Elam and Persia. At first, the writing was done on a vegetable substance, and the signs were pictures of actual objects, such as a circle for the sun. Papyrus and leather were next used as writing surface. When columns, bricks, cylinders or tablets of clay were used, however, the characters of the signs were altered, as they had to be pressed into the clay, resulting in such changes that they often bore no resemblance to the objects they represented. Stone, bronze, iron and glass were also used for the cuneiform inscriptions. This writing was in vogue from about 3800 B.C., used first by the Mesopotamian peoples and then by the Persian, until after the birth of Christ. For the next 1,600 years its meaning was lost, and for long it was not considered to be writing at all. It was variously conjectured that the cuneiform inscriptions were idle fancies of an architect, the work of worms, charms, or the language through which God had talked to Adam. The translation of these inscriptions is a great triumph, in which many scholars have gained fame by spelling out a few letters. Among the names connected with the translation the first of importance is Karsten Niebuhr, who established three distinct alphabets from the threefold inscriptions at Persepolis. Tychsen of Rostock in 1798, and Münter of Copenhagen in 1800, further advanced his theory. Grotefend of Hanover, in 1802, made the final discovery through the reading of three names, containing but twelve letters of the first alphabet. Bornouf recovered the signs, and Barton established their origin in 1913, explaining 619 out of 719 characters. The inscriptions are chiefly histories of reigns, for instance, the great Behistan inscription recording the reign of Darius Hystaspes, king of Persia, listing his ancestors, the extent of his power, the chief events of his reign, the palaces he built and his prayers. Cuneiform inscriptions are highly important for revelations on the great early eastern empires and Biblical kingdoms and events.

See ARCHÆOLOGY.

Cupid (*kū'pĭd*), in classic mythology, the god of love, the son of Mercury and Venus. The Greek god Eros, corresponds to the Roman god Cupid or Amor as he was often called. He is usually represented as a chubby, playful, and mischievous boy with bow and arrow and frequently with torch, quiver and wings. His eyes are often covered so that he shoots blindly. His darts were said to pierce the fish at the bottom of the sea, the birds in the air, and even the gods in Olympus. His association with the bow and arrow date from the fourth century B.C. It was then that Praxiteles and Lysippus completed their statues of Cupid which have become famous as representations of the god. In earlier Greek art Eros was represented as a winged youth, holding a flower or often a lyre, burning torch or whip as a symbol of his far-reaching power. Since the time of Lysippus the god has been represented universally as a chubby mischievous boy.

"Pretty dimpled boys, like smiling *cupids*."
—Shakespeare.

Cupule (*kū'pūl*), in botany, the peculiar involucre which invests the nuts of the oak, beech, chestnut, filbert. The bracts of the involucre coalesce, and in the acorn form a cup-like structure. The name is also applied to cup-like structures which appear on the bodies of certain liverworts, as Marchantiales. These contain the peculiar reproductive bodies called "gemmae."

Curaçao (*kōō-rä-sä'ō*), a colony in the Dutch West Indies consisting of six islands in the Caribbean Sea just off the coast of Venezuela. The colony is composed of two groups of islands situated about 500 miles apart. The first group is made up of the islands of Curaçao, Bonaire, and Aruba. The second group includes St. Martin (the northern part of which belongs to France), St. Eustatius, and Saba. The colony extends over an area of 403 square miles. Curaçao has an area of 210 square miles.

Government of the colony is under the administration of a Governor who is assisted by a Council composed of a vice-president and three members nominated by the Sovereign. There also exists a Colonial Council composed of thirteen members nominated by the Sovereign. The seat of government is Willemstad, situated on the island of Curaçao. With the exception of Curaçao, the other islands are under the administration of *Gezaghebbers* who are nominated by the Governor.

The principal products are maize, beans, pulse, cattle, salt and phosphate of lime. The chief industry is oil-refining. The colony's imports in 1931 were valued at 248,101,115 guilders; the exports at 342,861,330 guilders. Trade is carried on chiefly with the United States. There were forty-four schools in the colony in 1931 with an enrollment of 10,432 pupils. The population of the colony in 1931 was 71,769. The island of Curaçao had a population in that year of 45,191.

Curculio. See AVERIL.

Curfew. See BELL.

Curie (*kü-rē'*), **Mme. Marie Sklodowska,** one of the ten greatest scientists of the world, was born in Warsaw, Poland, on November 7, 1867. Her father, M. Sklodowska, was professor of mathematics and physics in the University of Warsaw. Her mother directed a school for girls. As a young girl, Marie, reared in an academic atmosphere, determined to become a teacher. She was educated in private and government schools in Warsaw. At the age of seventeen the young scientist accepted a position as governess. While thus occupied she set about perfecting herself in physics and mathematics. A short time later she went to Paris to work upon a doctorate at the Sorbonne. For five years she spent practically every waking moment of the day in study. During these years she lived in a lonely garret, preparing her own meals and studying continually.

It was while so enveloped in her studies that Marie Sklodowska met Pierre Curie, a French chemist and physicist who chanced one day to be at her professor's home. Just one year later, in 1896, the two young scientists were married, with the small fortune of 500 francs between them, but blissfully happy. After marriage Mme. Curie continued her studies, taught a class of young girls and kept busy with household duties in a three-room flat. In 1897 her first daughter, Irene, was born, and there followed radiantly happy days for Madame Curie. Motherhood did not force the young scientist to abandon her pursuit of a doctorate and it was while working upon her thesis, in 1899, that Marie Curie and her husband, Pierre, discovered two new substances which brought them international fame. The two scientists were conducting an investigation of pitchblende when they discovered Polonium and Radium. The first was named in honor of Mme. Curie's native home, Poland. It was not until 1903, however, that radium was reduced to a pure chemical element, an element which, since 1910, has been a blessing to thousands of victims of cancer, and to as many wounded soldiers of the World War. The Nobel Prize for chemistry was awarded to Marie and Pierre Curie and Henri Becquerel, in this same year for this discovery.

In 1904 a second daughter was born to M. and Mme. Curie. The joy of the loving wife and mother, however, was soon blighted. In 1906 Pierre Curie met his death as he stepped into a Paris street and into the path of a motor truck. After her husband's tragic death, Mme. Curie devoted the remainder of her life to work in the laboratory. Her only companions were her daughters. In 1911 she was again awarded the Nobel Prize, this time alone. In recognition of her great services to France, Mme. Curie was accorded many honors and honorary degrees from leading universities, although she declined to accept the decoration of the *Legion d' Honneur.*

One of the most unusual facts about Mme. Curie's life in view of her great service to mankind, is that from girlhood until her death at the age of sixty-seven, she lived most frugally. Every money prize awarded the great scientist was turned back into research. A chair in physics had been created for this famous woman in the Sorbonne in Paris. She supported herself by teaching in the University of Paris. In 1921, Mme. Curie came into possession of her first gram of radium. In that year the women of America purchased a gram of the precious element for $100,000 and presented it to the scientist for experimental purposes. In 1929 a second gram was presented the small, white-haired woman upon her second visit to the United States.

The labors of the frail little scientist wore strenuously upon her health. Although suffering from radium poisoning and pernicious anemia she continued to work twelve hours a day in her laboratory until in 1934 it became necessary for her to enter a sanitarium near Valence, France. It was there that on July 4, Mme. Curie's life of sorrow and work came to an end. Her body was interred beside that of her husband, Pierre, in the Pantheon.

See CHEMISTRY; RADIUM.

Curie, Pierre, a noted French physicist, was born in Paris in 1859. He was educated in Paris and at the age of twenty began independent researches in chemistry and physics which resulted in many valuable contributions to science. In 1895, he was appointed professor of physics at the *École Municipale de Chemie et de Physique.* It was in this same year that he met Marie Sklodowska, a young scientist who was working upon her doctorate in Paris, and who, in the following year became his wife. Together they conducted an investigation of pitchblende and studied the Becquerel rays which led them to the discovery of Polonium and Radium. In 1901 M. and Mme. Curie were awarded the La Case prize of the Academy of Science. Two years later they received the Sir Humphry Davy medal of the Royal Society of London and shared in the Nobel Prize for chemistry with Henri Becquerel. In 1904 M. Curie became professor of physics at the Sorbonne, and in 1905 became a member of the Institute of France. In this same year he was instantly killed by a truck as he stepped into a Paris street. His work was carried on by his wife, Mme. Curie until her death in 1934. Pierre Curie's memoirs were published in the *Comptes rendus* of the French Academy.

See CHEMISTRY; RADIUM; CURIE, MME. MARIE.

Curling, a game of Scottish origin played on the ice with round, flattened stones furnished with a handle (the stones being about thirty-six inches in circumference). There are two such games, one the rink play and the other playing for points. The ice rink is usually forty-two yards long (occasionally thirty-two yards) and ten yards wide. The game consists in playing four on a side in matches (each player having two stones) from a tee at one end of the rink, marked by a circle, to a tee at the far end, forty yards apart. The object of the game is to plant the stone near to the far tee and to guard it there, as well as to drive out the stone of an opponent. The weight of stone and handle is usually about fifty pounds. Each player makes use of a broom to clean the ice of any snow or impeding obstacles that may prevent the stone of a player, on one's own side, reaching the tee or striking aside an adversary's stone. Around each tee is a circle of seven feet radius, called the home or ring, while behind the near tee and beyond the far one are twelve feet spaces, divided into "backscores." Between the two tees (114 feet apart) is a middle score line; while at either end (twenty-one feet from each tee) is an intervening line called the hog-score. Two leaders called skips command the opposing teams and have the management of the game, each for his own side. The highest possible score in the game is seventy-two. The winning side must have the greatest number of stones nearest the tee.

In the point game there are no sides. Each player has two stones. Other stones are placed around the tee for him so that he may make his points by placing his ball or displacing the other balls from their original positions.

A set of matches is known as a "bonspiel." Although the game originated in Scotland it has spread far and wide as a healthful and manly game. To-day there are clubs scattered throughout England, Ireland, Canada, Newfoundland, New Zealand, Nova Scotia, Soviet Russia, Switzerland, and the United States, all associated with the parent body, the Royal Curling Club of Scotland. There are international matches or "bonspiels" held annually between the United States and Canada. Interstate matches are also held yearly at Winnipeg, Montreal, Ottawa, Hamilton, Toronto, St. Paul, Minneapolis, Duluth, Chicago, and other important cities. In 1867 the Grand National Curling Club was organized.

Curran (*kŭr'ăn*), **John Philpot,** a famous Irish orator and statesman, was born on July 24, 1750, at Newmarket, Island. He was idle and reckless both while at school and at Trinity College, Dublin. While studying law in London, he had his earliest practice in speaking at the students' debating societies. On his first rising in court, he was so nervous that he could hardly read the few words of a legal form, and, when told by the judge to read more clearly, he could not go on at all. But he soon conquered this, and his wit and eloquence made him famous throughout Ireland. He became a member of the Irish house of commons, was a supporter of Grattan, and, although a Protestant himself, had a warm sympathy with his suffering Catholic countrymen, and spoke eloquently in favor of the government's changing the policy of oppression which was driving them into rebellion. Curran's chief fame came from his speeches in court in behalf of the leaders of the rebellion of 1798, which made him beloved by the whole country. The union of Ireland with Great Britain that followed, Curran opposed as the destruction of his country. His health broken, deserted by his wife, his daughter dead of a broken heart soon after the execution of her lover, Robert Emmet, Curran drudged through eight years as master of the rolls. His last three years were spent in London, where his life was brightened somewhat by the brilliant society of Sheridan, Erskine and Thomas Moore. Curran's little figure, ugly face, bright, black eyes and great vivacity easily marked him out from all others, and his wit, sharpness and brilliant flow of language have hardly ever been equaled. He died Oct. 14, 1817.

Cur'rant. Species of the genus *Ribes*, which belongs to the saxifrage family. Associated with the currants in the genus are the gooseberries. The genus contains numerous species which are widely scattered, many of them being native to North America. Four species are cultivated in American gardens. *R. rubrum* includes the red and white varieties, and is found wild in both Europe and North America. *R. nigrum* is the European black currant. *R. Americanum* (*R. floridum*) is the American black currant, very similar to the European form. *R. aureum*, the Missouri or Buffalo currant with spicy, yellow flowers, is usually grown as an ornamental shrub, being native to western North America.

Currency, any article passing from hand to hand in payment, but it is convenient to designate metal money as coin and paper money as currency. Coin is said to have intrinsic value, but currency does not, and is said to be representative money, if backed by value as gold or silver in a vault. If issued because the coin of the nation has run out and the government is in need, paper currency is termed fiat money, having nothing back of it but the credit of the governmen.

Representative money is a great convenience, and it is to be expected that, except for token coins, it will eventually take the place of metallic money entirely. Paper currency is of ancient origin. The Chinese are the first to have invented paper and are also thought to have been the first to issue paper currency. The natives of Carthage are said to have used stamped bits of leather. The Byzantine emperors issued iron money. Catherine II of Russia issued paper money in 1768 to take the place of the clumsy copper kopeck of her empire.

The banks of the world have been issuing paper money for centuries. The practice of issuing bank notes not guaranteed by the government is reported to have been general in Germany and in England in the seventeenth century. In 1858 the Bank of Sweden, now the Riks Bank, began to issue notes payable at sight.

The use of paper money was introduced into the American colonies from England. Virginia placed tobacco in storage and used the receipts for currency. The earliest issue of paper currency in America was that of Massachusetts in 1690. The notes were used to pay soldiers. This practice was taken up by all the colonies and continued until the formation of the government of the United States. Several issues of American currency are of note. The Continental Congress issued paper money repeatedly to pay its war debts. This money, having no metallic backing, sank in value until a silver dollar is said to have been worth as high as 400 paper dollars. "Not worth a continental" became a popular expression. During the Civil War, both the Union and Confederate governments issued paper money. The failure of the Confederate efforts to establish a permanent government made the Confederate currency worthless except to collectors.

Paper money in circulation in the United States at the beginning of 1934 was strictly representative, although payment in metallic coin (gold) had been suspended during the economic emergency. There were seven kinds of paper money in circulation in the United States. National banks are authorized to issue National Bank Notes, secured by government bonds deposited with the U. S. Treasury. The Federal Reserve Banks may issue Federal Reserve Bank Notes and Federal Reserve Notes, each bank maintaining a reserve in gold of not less than forty per cent of its total issue. The government itself issues the following: Gold Certificates, authorized March 3, 1863; Silver Certificates, under the Bland Act of 1878; Treasury Notes of 1890, steadily decreasing; United States Notes or "greenbacks" of 1862 and 1863, this issue being limited to $346,681,016 protected by a gold reserve of about $154,000,000.

With the suspension of payment in gold in the United States on March 5, 1933, gold notes were withdrawn from circulation. Under the Emergency Banking Act of March 9, 1933, there was authorized an expansion of the currency by the acceptance of good assets of National banks (not necessarily government bonds) as security for the issuance of new bank notes by the government. The "inflationary" amendment to the agricultural relief bill, which was enacted into law on May 10, 1933, gave the President authority to issue monetary notes (greenbacks) up to $3,000,000,000. At the beginning of 1934, however, there had been no move by President Roosevelt to issue such currency.

See Money; Gold Standard; Banks.

Curry, Jabez Lamar Monroe (1825-1903), American educator, lawyer and minister, was born in Lincoln County, Georgia. He was a member of the Confederate Congress. After the war he became a minister, and later professor of law at Richmond College. For four years (1881-85), he acted as general agent of the Peabody Educational Fund and later was chairman of the Educational Committee of the Slater Fund. From 1885 to 1888 he represented the U. S. as minister at Madrid. His published writings embrace a treatise on *Constitutional Government in Spain*, a memoir of *William Ewart Gladstone* and a work, issued in 1894, on *The Southern States of the American Union*. Besides a *History of the Peabody Educational Fund*, he wrote a work on *Establishment and Disestablishment in the United States*.

Curtis, George Ticknor, American writer on legal topics, was born at Watertown, Mass., Nov. 28, 1812; and died at New York, March 28, 1894. Graduating at Harvard in 1832, he studied law and was admitted to the bar, practicing first at Boston and later at New York. He served for some years in the Massachusetts legislature, but at length devoted himself to the writing of legal text-books and the compilation of decisions in the courts of common law and admiralty in the United States. One of his most notable works is his *History of the Origin, Formation and Adoption of the Constitution*. Another useful work is his *Constitutional History of the United States from 1792–1864*. He also wrote lives of Daniel Webster and James Buchanan.

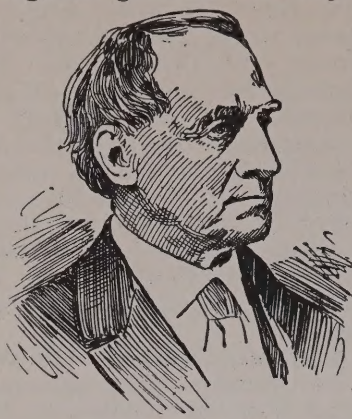
Cur'tis, George William, American author, was born in Providence, R. I., Feb. 24, 1824. As a boy he spent a year in New York as a clerk, and worked for some time as a farm-hand in Massachusetts. His first book, *Nile Notes of a Howadji*, was written after traveling in Egypt and Syria. He was one of the first editors of *Putnam's Monthly*, founded in 1852. He also was a partner in the undertaking, though having nothing to do with the business management. When, in 1859, the enterprise failed, Mr. Curtis sank all his fortune in the endeavor to save the creditors from loss, which he accomplished after six years' struggle. He wrote many essays, sketches and novels, and was successful as a lecturer. He is best known as the editor of *Harper's Weekly* and editor of the *Easy Chair* in *Harper's Magazine*. Mr. Curtis was prominent in politics, acting with the Republican party till 1884, but afterward supporting the Democrats. He died on Staten Island, N. Y., Aug. 31, 1892.

Curtius (*kōōr'tē-ōōs*), **Ernst,** was born Sept. 2, 1814, at Lübeck, Germany. He studied at Bonn, Göttingen and Berlin Universities. He made careful journeys in Greece, held several university professorships, and soon became noted as a writer on Greek history and geography. His great work, *The History of Greece*, is in the front rank of histories. Dr. Curtius was, late in life, professor at the University of Berlin. He died on July 12, 1896.

Curwen, John (1816–1880). Originator of the Tonic Sol-fa method of teaching singing. He was educated for the ministry at University College, London, but became author of *Grammar of Vocal Music; A Tonic Sol-fa Primer; Musical Theory; Musical Statics;* and other useful works.

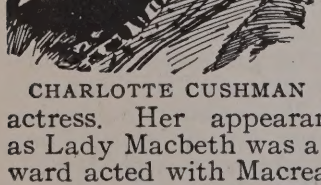
Curzon, George Nathaniel, Marquis, ex-viceroy and governor-general of British India, was born at Kedleston Hall, Derbyshire, England, on Jan. 11, 1859, and educated at Eton and at Balliol College, Oxford. He entered Parliament in the Conservative interest in 1886, and was subsequently under-secretary of state for India and under-secretary for foreign affairs. Lord Curzon has traveled considerably and published a number of thoughtful books. In 1895 he married the eldest daughter of Mr. L. Z. Leiter, a Chicago millionaire. In 1898 he was appointed by the Marquis of Salisbury, Viceroy of India, a post which he has filled with high ability. His writings include *Russia in Central Asia; Persia and the Persian Question;* and *Problems of the Far East*. In 1898 he was created Baron Curzon of Kedleston. His term of office as Indian Viceroy was extended. To recount the complete list of honors and offices of this man would fill a column in small type. As a business man, educator, parliamentarian in the House of Lords, and member of the British cabinet, he was a progressive leader. World fame came to him between 1898 and 1905, when still Viceroy of India. During those years he labored to establish a peaceful civil government in India, and when Lord Kitchener, as head of the British military government in the same country, wished to limit the civil and increase military authority, Curzon resigned. In 1907 he was made chancellor of Oxford University. In 1910 he opposed the Parliamentary Reform Bill. During the World War he was a member of the Coalition Cabinet and president of the Air Board, and from 1919 until his death in 1925 was Great Britain's able Minister for Foreign Affairs, representing his country at the Lausanne conference of 1922-23.

Cushing, Caleb, American diplomatist and jurist, was born at Salisbury, Mass., Jan. 17, 1800; and died at Newburyport, Mass., Jan. 2, 1879. After graduating at Harvard, he studied law, traveled in Europe, was a member of the Massachusetts legislature, and finally became a member of Congress. He served for eight years in the house, and in 1843–44 was United States commissioner to China. From 1845 to 1847 he served in the Mexican War, and was raised to the rank of brigadier-general. In 1852 he was appointed associate-justice of the supreme court of Massachusetts, and in the following year became United States attorney-general. In 1871-72 he acted as counsel at the tribunal of arbitration in Geneva; and from 1874 to 1877 was United States minister to Spain. Mr. Cushing published a number of works; but his chief publication was an account of *The Treaty of Washington* (1873).

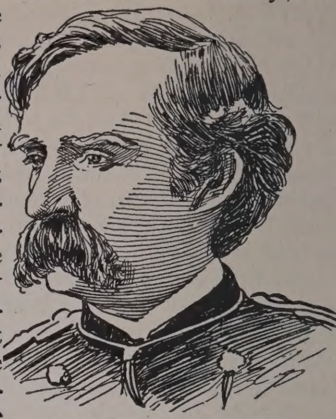

CALEB CUSHING

Cushing, William Barker, American naval officer, whose distinguished service was the destruction of the Confederate iron-clad *Albemarle*, was born in Wisconsin in 1842; and died at Washington, D. C., Dec. 17, 1874. He entered the Naval Academy in 1857, and in 1861, before graduating, he joined the United States navy and served throughout the Civil War. His most noted act occurred Oct. 27, 1864, at Plymouth, N. C., when, with a volunteer crew on a steam-launch and amid the hot fire of Confederate guns, he approached the Confederate ram, *Albemarle*, and fired a torpedo under her, which destroyed the iron-clad, along with his own launch. Cushing and some of his men swam ashore and escaped. For his gallantry the young hero was officially thanked by Congress, and in 1872 was advanced to the rank of commander. He died at the national capital two years later.

Cush'man, Charlotte Saunders, an American actress, was born at Boston in 1816. Her father became bankrupt and she helped to support the family when only 12 years old. She sang in concerts and made her first appearance in opera at Boston, in 1835, but soon after that lost her fine contralto voice. Not discouraged, by any means, she at once fitted herself to become an actress. Her appearance in New York as Lady Macbeth was a success. She afterward acted with Macready, and also gained fame in England. Miss Cushman died at Boston, Feb. 8, 1876.


CHARLOTTE CUSHMAN

Cus'ter, George Armstrong, an American general, was born at New Rumley, O., Dec. 5, 1839. He graduated at West Point in 1861, and as second lieutenant of United States cavalry made his first charge at Manassas, driving a Confederate force across Muddy Creek. As assistant-engineer at Yorktown, he planned the earthworks nearest the enemy's lines. He was the first to cross the river at Chickahominy, and while brigadier-general of cavalry routed Hampton's cavalry at Gettysburg, where he had two horses shot under him. In 1864 his brigade led the column in Sheridan's raid toward Richmond. He was brevetted major-general of volunteers for gallantry at the battle of Cedar Creek, and was in command of a division at the surrender of Appomattox. His rash but memorable campaign against the Sioux was undertaken early in 1876. With 1,100 men, including guides and scouts, he followed an Indian trail to Little Big-Horn River. Here he found a large encampment. Dividing his command, he tried to ford the stream three miles farther down. This brought on a battle in which Custer and his detachment of 277 troopers were surrounded by 3,000 warriors and slain to a man, June 25, 1876.


GENERAL CUSTER

Cu'ticle (in plants). In many plants, especially in leaves, the outer part of the walls of the epidermis becomes transformed into an impervious structure called cuticle. As new wall-material is continuously laid down, the cuticle gradually thickens and may become a very thick layer outside of the epidermis. It is a structure which protects well against drought, cold, etc., and is especially noticeable in plants of dry regions. The same substance is also developed on the surfaces of spores as a protection.

Cut'ler, Manasseh, an American botanist and Congregational minister, was born at Killingly, Conn., May 3, 1742. After graduating at Yale in 1765, he took degrees in the three professions of theology, law and medicine. He then became regimental and brigade chaplain in the Revolutionary War. He was an enthusiastic botanist, and his description of the native flowers of New England was the first botanical description made in the country. In wide scientific and other learning Dr. Cutler was the foremost man in America after Franklin. He is best known for his connection with the famous Ordinance of 1787. A member of the Ohio Company, formed by the Massachusetts army-officers to settle on Ohio lands, the purchase of the lands from Congress was intrusted to him. Some 5,500,000 acres were bought for the Ohio Company and others, and it was Dr. Cutler's making a condition of the purchase that the new settlers should take with them their own laws, that brought about the passage of the ordinance in its present form, including the anti-slavery clause. Dr. Cutler also was a member of Congress from 1801 to 1805. He died at Hamilton, Mass., July 28, 1823.

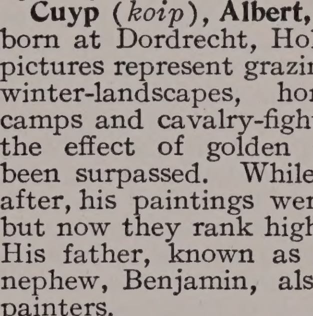
Cuttlefish, one of the mollusks, with a head surrounded by eight or ten arms, provided with cup-like suckers. Two of these arms are longer than the others, are enlarged on the ends and are called antennæ. They are related to the chambered nautilus, squid, etc. They have no shell externally, but underneath the skin of the back is found a limy structure called cuttlefish bone. It is often seen in bird-cages. The eyes are large and prominent, and there is a pair of horny jaws in the midst of the cluster of arms. The body is elliptical in outline, and has fins running along each side. It is surrounded by a mantle that also incloses a cavity for the gills, which are two in number. There is a funnel-like tube opening into the mantle-cavity, and the animal can, by contracting muscles, cause the mantle-cavity to close and then throw water out through the funnel or siphon in jets. It can swim forward by the use of the fins, and backward by throwing jets of water through the siphon. These animals also possess a bag of inky fluid, some of which can be thrown into the water when they become alarmed, and thus conceal their position while they swim away. Sepia and India ink were manufactured from this ink of the cuttlefish. They are carnivorous and seize their prey by means of their arms. The common squid of the Atlantic coast is closely related. It is commonly used for bait by the fishermen. The octopus or devilfish also is a near relative. See Octopus.

Cutworm, caterpillar of various species of owlet moths, a worm very destructive to vegetation. Both moth and worm are nocturnal. In the latter part of summer the female moth lays her eggs on plants near the ground. The larvæ feed on tender roots of grasses and various plants, and by spring are ready to attack early vegetation. During the day they hide under the surface, and coming forth at night cut off plants close to or just under the surface. They are enemies of garden vegetables, wheat, Indian corn, oats and cereals generally. Lacking other vegetation, almost all the numerous species adopt the climbing habit, ascend grape-vines, rose and berry-bushes and trees, devouring leaf-buds and eating of the early fruit. Hodge recommends, as protection against cutworms, folding a piece of stiff paper around a plant-stem in such a manner that the paper reaches an inch into the ground and two or three inches above the surface. To save their corn-fields, the Indians used to pick the cutworms off by hand, a method still in use. Toads and robins are effective helpers in keeping down the grievous pest.

Cuvier (*kü'vyā'*), **Georges, Baron,** was born Aug. 23, 1769, at Montbéliard, France. At 18 he became tutor in a family at Caen, Normandy, and while all France was in the throes of the reign of terror he peaceably spent his leisure eagerly studying the fossils and fishes of the neighboring coast. He became professor of comparative anatomy at the Jardin des Plants, in Paris. Cuvier was the first to compare the structure of fossils with that of animals, which we now find. He also founded the science of comparative anatomy. In this field his work and success were great, and he was recognized in France as the greatest of living naturalists. He also held office under Napoleon and Louis XVIII, and became a peer of France. He died at Paris, May 13, 1832.

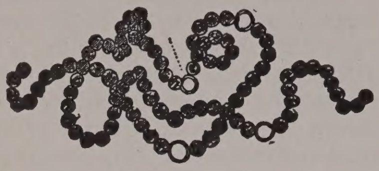
Cuyp (*koip*), **Albert,** Dutch painter, was born at Dordrecht, Holland, in 1605. His pictures represent grazing cattle, moonlight, winter-landscapes, horse-markets, hunts, camps and cavalry-fights; in his paintings the effect of golden sunlight has never been surpassed. While he lived, and long after, his paintings were little thought of, but now they rank high. He died in 1691. His father, known as Old Cuyp, and his nephew, Benjamin, also were well-known painters.

Cyanide-Process, The. The cyanide-process is one of two ways in which gold is extracted from low-grade ores, which contain only from 2 to 10 dollars per ton of gold. The ore is first crushed in stamp-mills, until it is quite fine; it is then treated with a solution of potassic cyanide, which dissolves the gold. This liquid is then treated with zinc, by which the gold is released and precipitated. This method is chiefly employed in the Transvaal gold-mines and, to a less extent, in the low-grade mines of Dakota, Wyoming and other western states.



GLOEOCAPSA, ONE OF THE CYANOPHYCEÆ

Cyanophyceæ (*sī'a-nō-fĭs'ē-ē*). One of the four plant-groups which make up the algæ, commonly called the blue-green algæ, and often the green slimes. They are the simplest of algæ, the body consisting of single cells or chains and filaments of cells, and are found in fresh water and damp places everywhere. All the forms show a tendency to become imbedded in a jelly-like substance which is merely the material of their walls transformed into mucilage. In addition to the chlorophyll they contain a blue pigment, which gives the bluish hue to their bodies. Many of them exhibit the power of motion, the free filaments of oscillaria moving almost continually, while the chains of nostoc at times wriggle out of the mass of mucilage in which they are imbedded. They have no sexual reproduction, multiplying almost exclusively by ordinary cell-division. In many of their characters, they closely resemble the bacteria, and by many botanists they are associated with them in a common group.


NOSTOC, ONE OF THE CYANOPHYCEÆ

Cy'cads. A group of plants which next to the conifers is the most prominent group of living gymnosperms. They are confined to the tropics and subtropics, and contain about 80 species, nearly equally distributed between the oriental and occidental tropics. The principal genus in the orient is *Cycas*, and in the occident *Zamia*, the latter genus being represented in southern Florida. The stem does not branch, and in many cases rises in a straight column, as in the palm, bearing at its summit a rosette of very large fern-like leaves. In other cases the stem is like a great tuber ensheathed by the thick bases of fallen leaves, and crowned with the rosette of huge fern-like leaves. The seeds are born in cones or strobiles, often of great size, but instead of ripening dry with a hard coat, as in the conifers, they become fleshy on the outside, with a hard stone within, and are much like plums. The group is very fern-like, and probably has come from the ferns. One of the most recent and important discoveries in connection with the group is that their sperms are ciliated and can swim, as in the ferns. See GYMNOSPERMS.

Cy'clone, a phenomenon of the earth's atmosphere, which is practically always exhibited in any region of low barometer, that is, in any region where the pressure of the air has fallen considerably below its average. To understand the nature of a cyclone the student must bear in mind the fact that wind consists simply in the transport of air from regions of high pressure to regions of low pressure. In the northern hemisphere the air does not rush directly in toward the center of a region of low pressure, but sweeps around toward the center in more or less of a spiral, so that an observer, looking down upon a center of low pressure, would find the wind traveling in a direction opposite that of the hands of a watch. This vorticose motion of the wind is called a cyclone. These cyclones are generally many hundreds of miles in diameter. Now and then they become very small in diameter, and in these circumstances they are apt to be exceedingly destructive, and are called tornadoes. In America these cyclones travel with a speed ranging from 20 to 40 miles per hour. If now we consider a region of high pressure, it is evident that the wind must in general blow away from the center of this region. These winds also assume somewhat of a spiral form, as they do in the case of low-pressure areas: only here the direction of rotation is clockwise. This phenomenon is known as an *anticyclone.* In general the anticyclone is not marked with the same regularity of structure as the cyclone. In the southern hemisphere the direction of rotation of these two kinds of vortices is exactly the opposite of that found in the northern hemisphere.

Cym'bals are a pair of thin, round, metal plates, with a hollow part in the center, in which a leather strap is fastened for holding the hand. When struck one against the other, a loud, harsh sound is made. They were used in ancient times, by the Greeks, in the worship of the goddess Cybele. The best cymbals are made in Turkey and China. Attempts to discover the composition of the metal have failed. The cymbals generally play the same part as the bass-drum, and in orchestras they are played by the same performer, one cymbal being fixed on the drum, the other held in one hand, while the other hand wields the drumstick. Cymbals are mostly used in military music.

Cyme (*sīm*). A flat-topped cluster of flowers in which the inner flowers bloom first. See INFLORESCENCE.

Cy'press. Species of several genera of conifers. *Chamæcyparis* contains five species native to North America and Japan. They are all handsome trees, with the opposite scale-like leaves densely clothing the branches. The best-known species are the white cedar of the eastern United States, a tree 70 to 80 feet high; the yellow cedar of the northwest coast, a tree which reaches 120 feet in height; and Lawson's spruce of the Pacific coast, a magnificent tree which sometimes becomes over 200 feet high. *Cupressus* is a genus containing about ten species, found both in North America and the orient. They resemble the species of *Chamæcyparis* and are very ornamental evergreen trees, but are hardy only in California and the gulf-states. *Taxodium* contains three species, one in China, one in Mexico, the third (*T. distichum*), the bald cypress, in southeastern United States. This last species grows in swamps and along rivers, is a large tree, often reaching 150 feet in height, and gives the name to the so-called cypress-swamps.

Cy′prus, an island of the Mediterranean, south of Asia Minor and west of Syria. It is about 140 miles long and 60 miles wide, and covers 3,584 square miles. There are two main ranges of mountains; the highest peak is Mt. Troödes, 6,352 feet above the sea. There are no harbors, rivers or lakes worthy of the name. It is governed by Great Britain by treaty (1878) with Turkey. The capital and seat of government is Nicosia (population, 16,052); the two chief ports are Larnaca and Limasol.

Cyprus was colonized very early by the Phœnicians and afterward by the Greeks. It came under the sway successively of the Egyptians, Persians, Macedonians and Romans. The Cypriotes were one of the first Gentile people to become Christians, and were visited by St. Paul. The island was afterward taken by the Saracens; by Richard I on his way to Syria during the third crusade; by Venice; and lastly by the Turks in 1570. In 1878 Cyprus was occupied by the British, with the understanding that it is to keep it until Batum, Kars and Erzerum are restored by Russia to Turkey.

Cyprus produces wheat, barley, cotton, silk, flax, tobacco, wool, oranges, olives, grapes, etc. and great quantities of wine. Cyprus was once noted for its copper-mines, and copper got its name from that of the island, but it is only mined now at one place. The forests have mostly disappeared. The great scourges of the country are locusts and goats. The Cypriotes are peaceable, orderly and easily ruled. They are healthy and well-grown; the men, as a rule, are handsome, but the women are rarely so. Modern Greek and Turkish are spoken on the island. Population, 274,108.

Cy′rus the Great, founder of the Persian empire, is first known to us from the record on the cuneiform, clay tablet-and-cylinder, which recounts his reign, his conquest and capture of Astyages, king of Media, in 549 B. C. At this time Cyrus was called king of Elam. Year after year was idly spent by Nabonidas, king of Babylonia, at Terma, a suburb of the capital, Babylon, while his son—doubtless Belshazzar—was with his army in Akkad (northern Babylonia). In 538 Cyrus, favored by a revolt of the tribes on the Persian Gulf, advanced on Babylon from the southeast, and, after giving battle to the army of Akkad, took Sippona and lastly Babylon "without fighting." Cyrus at once originated a friendly policy in religion. The nations who had been carried captive to Babylon, along with the Jews, were restored to their countries and allowed to take their gods with them. The empire of Crœsus in Lydia had been taken two years before; and Cyrus was now master of all Asia from the Mediterranean to the Hindu-Kush. The conqueror's hold over Asia Minor and Syria was much strengthened by his friendly relations with the Phœnicians and the Jews, who received the news of his triumphs with joy. After the great king had widened his dominions from the Arabian Desert and the Persian Gulf to the Black Sea, Caucusus and Caspian, he died in 529 B.C. Cyrus ranks high among Asiatic conquerors. He was a wise ruler, whose aim was to soften by kindness the harsh rule which his sword was constantly extending.

Cy′rus the Younger, the second son of the Persian king, Darius Nothus, was born in 424 B. C. He headed a conspiracy against his brother Artaxerxes Mnemon, who had succeeded to the throne in 404 B. C. The plot was discovered, and he was sentenced to death, but afterward pardoned and even restored to his office as satrap of Asia Minor. Here he planned a war against his brother, but hid his purpose till the last. In the spring of 401 B. C. he left Sardis at the head of 100,000 Asiatic and 13,000 Greek hired troops, under pretense of punishing the robbers of Pisidia. Artaxerxes, warned of his treachery, was ready to meet him. The battle was fought on the plains of Cunaxa. Cyrus was defeated and slain, although the Greeks fought with the greatest courage and even drove back that part of the enemy in front of them. Xenophon's *Anabasis* gives an account of the expedition. It showed that the Persian empire was a shell, and inspired Agesilaus and Alexander to assail it.

Cy′toplasm (in plants), the name applied to the general protoplasm of a cell as distinct from the nucleus. See Cell.

Czar (*zär*) or **Tsar,** the title of Russia's rulers while the nation was an empire. The word comes from an old Slav word *cesar*, which the Poles spelled as *czar*, meaning king or emperor. The Russians used the Latin word *imperator* to express the idea of emperor. The first independent Russian monarch to use the title was Ivan IV, "the Terrible," who was crowned at Moscow in 1547. The Empress of Russia was styled the Czarina. The following have been the czars and emperors of Russia, from the era of the election of Michael Romanoff. Czar Peter I was the first ruler who adopted, in 1721, the title of emperor.

House of Romanoff—Male Line.

Michael	1613	Ivan and Peter I	1682
Alexis	1645	Peter I	1689
Feodor	1676	Catherine I	1725
Peter II	1727		

House of Romanoff—Female Line.

Anne	1730	Elizabeth	1741
Ivan VI	1740		

HOUSE OF ROMANOFF-HOLSTEIN.

Peter III	1762	Nicholas I	1825
Catherine II	1762	Alexander II	1855
Paul	1796	Alexander III	1881
Alexander I	1801	Nicholas II	1894

Czecho=Slovakia, the most promising and most firmly established of the independent states which were created out of the ruins of the Austro-Hungarian empire. The western half of the country is made up of Bohemia and Moravia, where the bulk of the inhabitants are Czechs. The eastern half comprises Slovakia and Ruthenia, which were formerly parts of Hungary. The Slovaks are closely related to the Czechs in race and language, but are separated from them by the Little Carpathian Mountains. The Ruthenians, who are also called Rusins or Little Russians, are Slavs more closely related to the Russians of the Ukraine. The Treaty of Versailles guaranteed local autonomy to the Ruthenians.

Czecho-Slovakia is a land of rich mineral deposits, especially iron, coal, copper, silver, and gold. The chief crops are grain, potatoes, beets and mustard. Parts of the country are also famous for manufactures, as Bohemia for its glassware and Moravia for its woolen goods. The chief cities are Prague, formerly the capital of the kingdom of Bohemia and now of Czecho-Slovakia, Pilsen, Brunn and pressburg.

During the World War a Czech army of about 100,000 men fought with the Russians. The independence of the new nation was recognized by Great Britain on August 3, 1918, and by the United States one month later. The relative ease with which the yoke of the Austrians was cast off, and the comparative firmness with which the new government was established, were largely due to the efforts of Professor Thomas G. Masaryk, under whose guidance a democratic constitution, providing equal suffrage for men and women, was adopted. Masaryk was elected the first president of the republic.

Czechs, (*cheks*) are the most westerly branch of the great Slavic family of nations. In the latter half of the 5th century A. D. the Czechs migrated from their lands in Carpathia, on the upper Vistula, to the country now known as Bohemia. As a result of the World War the Czechs helped form the Czecho-Slovak republic.

Czernowitz, (*cher'no-vits*), a provincial capital of Austria, stands 720 feet above the sea, near the Pruth River. Among its buildings are the palace of a Greek archbishop, his cathedral, the Armenian church, the synagogue, and the municipal theater. The university, founded in 1875, has about 50 professors, and lecturers and about 1,000 students. Population about 100,000, of whom 20,000 are Jews.

Czerny, (*cher'ne*), **George,** meaning Black George, leader of the Serbians in their struggles for independence, was born of poor parents, Dec. 21, 1766, near Kragujevatch, Servia. He was concerned in a rebellion against the Turks in 1787, and afterward became a cattle-dealer. In 1801 a detachment of janizaries broke into his house and plundered it. Black George fled, vowing vengeance. He managed soon to gather a band of discontented fellow-countrymen, and began a sort of guerrilla warfare against the Turks. In course of time his little band increased in numbers, and in 1804 he was able to capture the fortress of Schabaz. Later on he besieged Belgrade, and early in 1806 routed the Turks at the Rivers Drina and Morava. Secretly aided by Russia, he captured Belgrade in December of that year (1806). The treaty of Slobosje was extorted from the Ottomans two years later, after which Black George was elected governor by the people and recognized as prince of Serbia by the sultan. The Russians sustained the prince in his position till Napoleon's invasion of Russia in 1812, when he was perforce left to shift for himself. The Turks at once recommenced hostilities. They were successful, and Czerny was compelled to flee to Austria, where he lived for some time. Meanwhile the freedom of Serbia had been again secured through the leadership of Milosch Obrenowitch. When Czerny returned, in July, 1817, he was murdered at the instigation of the new leader, Prince Milosch.

D

D (*dē*), the fourth letter, is a vocal consonant. It is classed as a dental or hard palate sonant, because made by the point of the tongue against that palate or the front teeth, as in *day*, *fixedness*, *old*. When preceded by a surd in the same syllable, *d* sounds as *t*, as in *arched*, *hissed*, *looked*. It is silent in *handkerchief*, *handsome*, *windrow* and the first syllable of *Wednesday*. The Romans used D as a numeral (500) as well as a letter.

Dacca (*dăk'ȧ*), a city of Bengal proper, 150 miles northeast of Calcutta, on the north bank of the Buriganga. It occupies an area of eight square miles, and consists of a dull esplanade and one long street meeting at right angles, with a network of narrow, crooked lanes. It, however, has unusual advantages for inland navigation, as its position commands the principal waterways of the delta. About 1610 it became the seat of the Mohammedan government of Bengal, which rank it kept, with a short break, until 1704. In the 18th century it became celebrated for its muslins, and the English, French and Dutch had manufactures here. It has since declined (the population falling off from 200,000 in 1800 to 69,212 in 1872), until the last few years have revived its prosperity. Besides manufactures, Dacca has a college and good schools. The Dacca and Maimansingh state-railroad, opened in 1886, has helped its growth. Population, 85,000. Dacca also is a district in Bengal, watered by the Brahmaputra. Its population is close upon 10,000,000.

Dacia (*dā'shĭ-ȧ*), an ancient country of Europe, of uncertain limits, lying north of the Danube and south of the Carpathian Mountains. It comprised at least what now is the eastern part of Hungary, Transylvania, Moldavia and Wallachia. It was inhabited by an exceedingly warlike people of German origin, who held the Romans in check from 10 B. C. until 100 A. D. During the reign of Domitian the Romans were even obliged to pay tribute. In 106 A. D. Trajan reduced the country to a Roman province. The Romans held most of this territory until 274 A. D., when Aurelian abandoned it to be overrun in succession by the Goths, Huns, Gepidæ, Avars and Scythians.

Dædalus (*dēd'a̤-lus*), in Greek fable, an Athenian who personified the beginning of the arts of sculpture and architecture. He killed his nephew and pupil, who envied his growing skill, and had to flee to Crete, where he carved the well-known cow for Queen Pasiphaë and designed the famous labyrinth for King Minos in which to confine the minotaur. He was imprisoned but escaped, forming wings for himself and his son Icarus, with which to fly across the sea. He flew safely across the Ægean, but Icarus flew too near the sun, the heat of which melted the wax that fastened his wings to him, so that he fell and was drowned in that part of the sea which the ancients afterward called Icarian. At Cumæ, in Italy, Dædalus dedicated his wings to Apollo. Many early works of art were ascribed to him. Discoveries in Crete have made it probable that Dædalus was a real person.

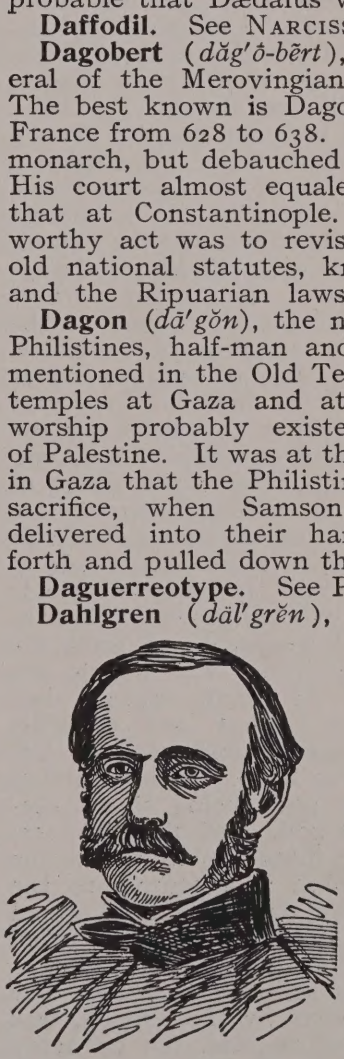
Daffodil. See Narcissus.

Dagobert (*dăg'ō-bẽrt*), the name of several of the Merovingian kings of France. The best known is Dagobert I, who ruled France from 628 to 638. He was a vigorous monarch, but debauched in his private life. His court almost equaled in magnificence that at Constantinople. His most noteworthy act was to revise and publish the old national statutes, known as the Salic and the Ripuarian laws.

Dagon (*dā'gŏn*), the national god of the Philistines, half-man and half-fish. He is mentioned in the Old Testament as having temples at Gaza and at Ashdod, and his worship probably existed in other parts of Palestine. It was at the temple of Dagon in Gaza that the Philistines offered a great sacrifice, when Samson, who had been delivered into their hands, was brought forth and pulled down the temple.

Daguerreotype. See Photography.

Dahlgren (*däl'grĕn*), **John Adolph**, an American naval officer, was born at Philadelphia in 1809, and died in 1870. He early entered the navy as midshipman, and soon rose in rank. While employed in the ordnance-department from 1847 to 1857, he made a series of experiments in the construction of heavy shell guns, which resulted in



ADMIRAL DAHLGREN

the adoption of a new pattern, called the Dahlgren gun. It is a muzzle-loading, cast-iron, smooth-bore gun, with great thickness of metal at the breech. Many of these guns are still in the United States service. Dahlgren also invented a rifled cannon for naval warfare. He did good service in the Civil War, being appointed rear-admiral and having command of the South Atlantic squadron. In 1869 he took command of the Washington navy yard, which he had held before the war.

Dahlia (*däl'yȧ*). A genus of the composite family, containing some of the commonest garden-plants. All of the ordinary garden-forms are derived from a single variable species *D. variabilis*. The genus contains about ten species, which are mostly Mexican, a few occurring in Central and South America. As an illustration of the varieties which can be made from a single species, it may be said that over 3,000 different garden-varieties of *D. variabilis* have been named and published in catalogues.

Dahomey (*dä-hō'mā*), a French dependency since 1894 in western Africa on the upper Guinea coast, formerly a negro kingdom. It lies between the German colony of Togoland and the British territory of Lagos, and extends inland for about 130 miles. On the north it is bounded by the French military territory of the Niger. It is known to possess an area of 65,000 square miles, with 70 miles of seaboard. It is almost surrounded by hostile tribes, and the boundaries used to change with the king's changing fortunes in war. The main port is Whydah, from which a road extends to the capital, Abomey, a distance of 65 miles. Dense forests and dismal swamps cover about two thirds of this distance; then vast rolling plains rise for many miles in the direction of the Kong uplands. The Avon and Denham lagoons receive the rivers of the country, none of which, however, are important. Groves of oil-palms encircle each town, from which palm-oil is made in great quantities; while the rich soil yields all the wealth of tropical growth. Cotton-cloth is made, and weapons and tools are forged from native iron. The people are negroes, generally of small stature but robust and active. They are sociable, equally fond of dancing and of rum, but warlike and prone to theft. Fetish-worship prevails, the main gods being the snake-god, tree-gods, sea-gods and the thunder-gods. Human sacrifices are made to the sea-god. At Whydah is a temple to the snake-god, containing over a hundred sacred snakes. Annually, in October, are revived the grand "customs," when as many as 500 victims are sometimes sacrificed. The king, before his defeat by the French, was the most absolute of despots. Of his army of 10,000 soldiers, the best part consisted of Amazons, mighty and blood-thirsty women. Monster slave-hunts formerly occurred, but the slave-trade is now ruined. The Dahoman kingdom dated from the beginning of the 18th century, and reached the height of its power under Gezo, who reigned from 1818 to 1858. The seat of government is Porto Novo (19,000 inhabitants). Abomey, the old capital, about eight miles in circumference, has 15,000 people, and Whydah about 12,000. The population is estimated at 1,000,000. The imports amounted to $7,139,655 in 1910, and the exports to $3,576,470. Cottons, machinery, drink and tobacco were the principal imports; palm-nuts and palm-oil the leading exports. Income and outgo balanced in 1910 at 3,235,000 francs. An iron pier marks the port of Kotonu, about 125 miles of railway on the projected line to Chaoru being completed from that point, with a branch 20 miles long to Segborué and Whydah. Ultimately the line will reach the Niger. Another railroad is building along the Lagos frontier. Kotonu is connected with Abomey, the Niger and the Senegal by telegraph, 1,725 miles altogether, with 120 miles of telephone lines.

Dairy. See DAIRY-FACTORY, MILK and BUTTER.

Dairy-Factory. Dairying as a special business has been widely developed in America, during the latter half of the 19th century, through the use of the factory-system. The first factory was organized in New York in 1860; soon many others were started; and in 1866 in New York there were nearly 500 of them in operation, with a stock of cows worth over $10,000,000 and with farms covering about 1,000,000 acres. This industry soon spread over the country and into Canada, and was adopted in European countries as the American system of dairying. At first cheese alone was made, but soon butter was added; moreover, special factories for butter were introduced, called creameries. In the creamery the cream gathered from hundreds of cows is worked by one skillful butter-maker and commands a higher price than homemade butter. It is sent to great distances in cold-storage or refrigerator cars. Foreign buyers may have it on their tables within two weeks of churning. The dairy-interest has reached vast proportions in the United States and Canada; at least 1,500,000 farms, with 17,000,000 cows and 100,000,000 acres of land, are devoted to the various branches of the industry. In 1909 the milk-yield of the United States was 9,888 million pounds, while 311 million pounds of cheese and 627 million pounds of butter were produced.

Daisy, a familiar wild flower and member of the Composite family. Alice Dowd speaks of it as "one of the most successful flowers in the most successful of flower families." The farmer often calls it a weed, thinking wrathfully of its "success." The white rays of the White Daisy or White Weed attract insects, and in the closely-packed flowers that form the center the visitors find a feast that invites them to linger. It is also known as the Common Daisy, Ox-Eye Daisy, Love-Me, Love-Me-Not and Marguerite. The Daisy is the national flower of Italy. The name Daisy means Day's Eye, the English daisy closing with the close of day. This is a near relation of our white daisy, but has a pinkish tinge. It is the "wee, modest, crimson-tippit flower" of which Burns sang. Our Purple Daisy, the so-called Late Purple Aster, has a wide range, from Massachusetts to Minnesota and southward to the Gulf. The Blue Spring Daisy or Robin's Plantain flowers from April to June, is distributed east of the Mississippi, and prefers moist ground, grassy fields, hills and banks. The little Michaelmas Daisy bears a wealth of lovely feathery bloom, which may last to December. The Pig-Stye Daisy or Dog-Fennel is in ill-repute, as its name suggests; a rank weed, the unpleasant odor is repulsive to insects generally with the exception of flies, its chief fertilizers. From the western clover fields the ox-eye has even crossed the Atlantic, and in Europe found itself in high favor—no longer a weed, but given place in stately gardens.

Dakota River rises in the northeastern part of North Dakota, and flows south through South Dakota. It empties into the Missouri about eight miles below Yankton. Its length is estimated at 800 miles.

Dakotas (*dȧ-kō'tȧs*), a tribe of Indians residing between the Rocky Mountains and the Mississippi. Their language is thought to be nearer the Mongolian than that of any other Indian family. It is said that they came eastward from the Pacific till they met the Algonquins, and were held in check by them at the Mississippi. One tribe, the Winnebagoes, fought their way through to Lake Michigan. Another tribe, the Arkansas, settled on the Ohio, but were driven down the Mississippi to the region that now bears their name. The other tribes of the family are the Assiniboin or Stone Sioux, the Dakotas proper or Sioux, the Missouris, Omahas, Poncas, Iowas, Osages, Kansas, Ottoes, Minnetarees and Crows. It is now asserted that the Sioux followed the buffalo westward from the Atlantic across the Mississippi. There are some 30,000 Dakotas.

D'Alembert (*dä'lon'bêr*), **Jean le Rond,** a distinguished French mathematician and dynamicist, born in 1717, died in 1783. He was the illegitimate son of a French artillery general, Destouches, and of Mme. de Tencin. Left on the steps of a church in Paris, he was sent, not to a foundling asylum, but to a small town near Amiens. His father, returning from foreign lands, rescued the boy, took him to Paris, and educated him at the Mazarin College. It was at this institution that he assumed the name D'Alembert. At the age of 20 he settled to his life-work, the study of geometry and dynamics. He published an enormous number of papers; but his *Treatise on Dynamics*, which he completed at the age of 26, transcends all his other work in importance. The greatest advance which we owe to him is the introduction of a method (known as D'Alembert's principle) by which any of the complex problems of dynamics may be reduced to a corresponding problem of statics. By this simplification he obtained the solution of many otherwise insoluble problems. D'Alembert's *Dynamics* has been translated into German in volume 106 of Ostwald's *Classics of the Exact Sciences*, where it may be had at small cost.

Dalhousie (*dăl-hou'zĭ*), **James Andrew Broun=Ramsay, Marquis of,** was born at Midlothian, April 22, 1812. By the death of his elder brother he became Lord Ramsay, and on the death of his father he entered the house of peers as Earl of Dalhousie. He distinguished himself in Parliament, holding with credit many important posts, and in 1847 proceeded to India as the youngest governor-general ever appointed to that country. His course there was marked by energy and ability, and earned him the title of the greatest of Indian proconsuls. He carried out many reforms, opened the country by railroads, telegraphs, roads and canals, and added four kingdoms to the British possessions. At the end of eight years his health gave way and he returned to England. He died on December 19, 1860.

Dal'las, George Mifflin, an American statesman and diplomat, was born at Philadelphia in 1792, and died there in 1864. He began his career by traveling as private secretary with Albert Gallatin to St. Petersburg and Ghent, and then entered upon the practice of law. Besides holding city and state positions, he was United States district-attorney, senator, minister to Russia and England and vice-president under Polk from 1845 to 1849.

Dallas, a city of Texas, the capital of Dallas County, situated on Trinity River, about one mile below the mouth of the West Fork and 315 miles north of Galveston. It is an important insurance and financial center of the southwest, and has extensive railroad connection through the following lines: The Texas & Pacific, Houston & Texas Central, Missouri, Kansas & Texas, Rock Island, Texas & New Orleans, Cotton Belt, Trinity & Brazos Valley, Santa Fe and the Frisco; and also electric lines to Ft. Worth 32 miles west and to Sherman 64 miles north. Dallas has good public schools and other institutions of learning, among which are the Texas Baptist University, St. Mary's Institute (an Episcopal college for women), Medical Department of Southwestern University, Medical Department of Baylor University, the Southern Methodist University and several academies and commercial colleges.

Among the important public buildings are Carnegie Library, Oriental Hotel, St. Paul's Sanitarium and the Baptist Memorial Sanitarium. Lying in a fine agricultural country, Dallas has a large trade in grain, cotton, hides, vehicles, farm and mill-machinery, saddlery and harness. It manufactures extensively cotton-gin machinery and presses, leather-goods, cotton-goods, cotton-oil products, candies, crackers, saddles, harness, buggies, furniture. It is the home of the state-fair of Texas, and has an abundant supply of good water and all modern city conveniences. Population, 260,000.

Dalles of Wisconsin, The, near Kilbourne, Columbia County, are a picturesque gorge with high vertical walls through which the Wisconsin River rushes after rains with great violence; but in dry seasons not so fast as to prevent its navigation by small steamboats. *Dalles* is a French name for the rocky gorges in which rivers sometimes for a portion of their course are confined, and flow at great speed.

Dalma'tia, formerly a province of Austria along the Mediterranean and now governed in part by Italy and in part by Jugo-Slavia. Dalmatia appeals to travelers by its picturesque scenery, being diversified by mountains and numerous small lakes and rivers. The highest mountain is Orjen, with an elevation of 6,235 feet. About one ninth of the land is arable; nearly half is in pasture; and woods occupy about one third. Cattle-rearing, seafaring and fisheries are the chief industries. Besides Dalmatians, the people are made up of Italians, Albanians, Germans and Jews. The Dalmatians are a fine race of men, bold and brave as seamen and soldiers, and formerly were the main support of the military power of Venice. The cities are almost all on the coast. Dalmatia once was a considerable kingdom; but after various attempts it was conquered by Rome in the time of Augustus. After the fall of the western empire, it passed successively into the hands of Goths, Slavonians, Venetians, French and Italians, and since 1814 it has formed part of Austria. In 1869–70 and again in 1881 Dalmatia was the scene of insurrections. The chief towns of the province are Zara, Spalato and Ragusa. Population, 650,000.

Dalton, John, an English chemist and natural philosopher, was born in 1766. He was appointed to the chair of mathematics at New College, Manchester, in 1793. He published notable essays and papers on scientific subjects, and also lectured in London. His atomic theory of chemical action, which he announced in 1808, gave him world-wide fame. Various academic honors were showered upon him, and the English government gave him a pension. He died on July 27, 1844.

Dalton Plan. This comparatively new method of adjusting the curricula to the pupils has met with much success in many schools, where it has been applied from the fourth grade through the high school. Each subject of study is divided into twenty sections to cover one month. Pupils with greater abilities in certain subjects may finish one or two subjects before the time scheduled; these are then given the next twenty units in their completed subjects if they have kept their other subjects up to the average time schedule. Every pupil has a job card which is checked each day so he can see just where he stands in all studies. The Dalton Plan has been adapted for both large and small schools. Formal classes in each subject are held once or twice a week. The study periods and the other periods formerly spent in class are devoted by the pupils to study, at times individually, at times in groups, at times with the teacher supervising and directing individuals. The advantages maintained are: fewer unruly students, increased incentive, swifter advancement for brighter pupils, recognition of each pupil's particular abilities, and development of individual responsibility. The combined advantages of class work, group work, and individual work, together with supervised study, the project method, and socialized recitation are all used in the Dalton Plan. In the larger cities certain schools are being conducted along the principles above outlined, and results being watched carefully.

Damas'cus, capital of the Turkish vilayet of Syria and the largest city of western Asia, is situated about 70 miles from Beirût on the Mediterranean, in the plain of Damascus, near the mouth of the gorge through which the Barada River forces itself into the plain. The city stands at an elevation of 2,260 feet above the sea level, and to the northwest rises Anti-Libanus, to a height of 3,840 feet, crowned by the Dome of Victory. Seen from this mountain, the city presents the form of a tennis-racquet, the suburb Meidan forming the handle, and the remainder of the city being formed on the seven canals, by which water is drawn off from the Barada. Two of these canals are the Abana and Pharpar of Scripture. (Damascus claims to be the world's oldest inhabited city). The old citadel, going back to 1219, the palace and the mosque built in the 8th century tower high above the city. There are, besides, 70 other mosques and more than 150 chapels for prayer and instruction. The religious communities occupy different quarters of the city; and embrace Christians, Jews and Mohammedans. The different industries also have each their separate quarter: the silversmith's, the saddler's, the shoemaker's, the Greek and the book-bazar. On either side of the narrow streets are the rows of arched niches, in which are the shops of the city. Each shopkeeper sits cross-legged, with his wares piled up around him, awaiting customers. Behind the mud-walls and mean entrances there are splendid houses, fitted often with barbaric splendor. One of the sights of Damascus is the procession to Mecca, called the Haj. On these festivals, for miles around, there is a sea of human beings, dressed in the brightest and most striking colors. Circassians and Afghans, Kurds and Kalmuks, Turkomans and Tecks and most of the various tribes and peoples of the East are represented in the brilliant procession. A railroad to Medina, Arabia, one thousand miles long, was opened in 1908. The exports and imports are large. In the city there are about 5,000 hand-looms, and 10,000 workmen are employed in weaving silk, cotton and woolen fabrics, carpets and similar articles. Much is being done in education, especially by the Christians. Population, 350,000. See Parker's *Five Years in Damascus.* G. G. Smith's *Historical Geography of the Holy Land;* Baedeker, *Syria.*

Damask, a fabric originally manufactured at Damascus, from which it derives its name. It was made of silk and was distinguished by its ornamental woven figures of fruits, flowers, animals and landscapes. The term is now applied to stuffs made for table-covers, window-curtains and furniture-coverings, with patterns woven in the loom; but not to those in which the design is printed. There are silk, linen, woolen and cotton damasks, and some are of two materials, usually dyed in different colors. Table-Linen damask is known to nearly everybody. Damask fabrics are now manufactured in many countries.

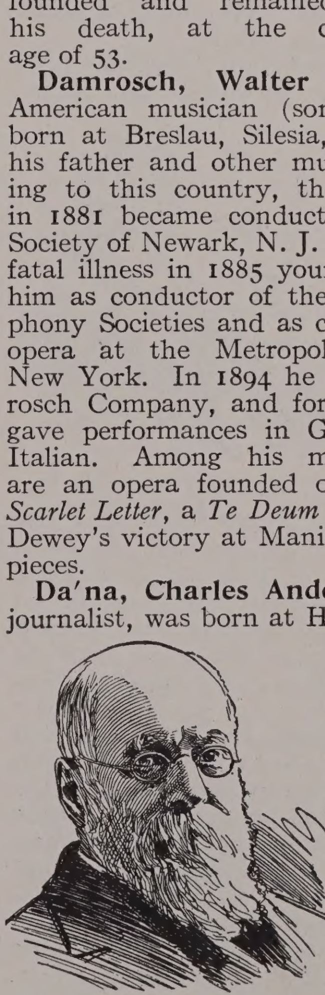
Damocles (*dam'ō-klēz*), one of the courtiers and flatterers of the elder Dionysius, tyrant of Syracuse. As Cicero tells the story, Damocles, having extolled in the highest terms the grandeur and happiness of royalty, was reproved in a singular way by Dionysius. Damocles was placed at a magnificent banquet, surrounded by all the splendor of royalty, and in the midst of his enjoyment, suddenly looking upward, he saw a naked sword hanging by a single horsehair above his head. The lesson taught him the uncertain nature of the happiness of kings.

Da'mon and **Pyth'ias,** two famous Pythagoreans of Syracuse, who lived early in the 4th century B. C., and whose names are always joined as the types of true and noble friendship. Pythias had been condemned to death by the elder Dionysius, tyrant of Syracuse, and was allowed to go home for the purpose of arranging his affairs, Damon pledging his own life for the appearance of his friend at the time appointed for his doom. True to his promise and in the midst of the greatest difficulties, Pythias returned just in time to save Damon from death. Struck by so noble an example of friendship, the tyrant pardoned Pythias and asked to be admitted into their sacred fellowship. It is said that not Pythias but Phintias, is the right name.

Damrosch (*dăm'rŏsh*), **Leopold,** musical director, composer and solo violinist, was born at Posen, Prussia, Oct. 22, 1832; and died in New York City, Feb. 15, 1885. His professional career began in 1855, and by 1866 he had become musical director of a Breslau theatre, and in 1871, after coming to this country, leader of the Arion Society of New York. To him music-lovers are indebted for introducing German opera into America with great *éclat*, his concerts, operas and oratorios at the Metropolitan Opera House, New York, being hailed as musical events of the season. He also was director of the New York Oratorio and Symphony Societies of that city, both of which he founded and remained leader of until his death, at the comparatively early age of 53.

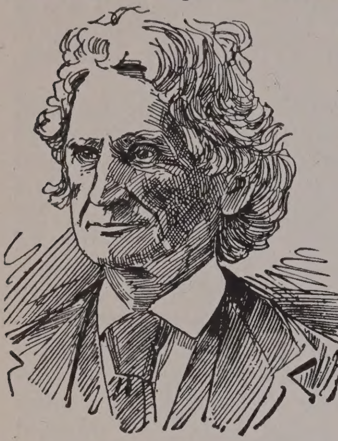
Damrosch, Walter Johannes (1862), American musician (son of Leopold), was born at Breslau, Silesia, and studied under his father and other musical experts. Coming to this country, the youthful musician in 1881 became conductor of the Harmonic Society of Newark, N. J. During his father's fatal illness in 1885 young Walter succeeded him as conductor of the Oratorio and Symphony Societies and as conductor of German opera at the Metropolitan Opera House, New York. In 1894 he organized the Damrosch Company, and for a number of years gave performances in German, French and Italian. Among his musical compositions are an opera founded on Hawthorne's *The Scarlet Letter*, a *Te Deum* in honor of Admiral Dewey's victory at Manila and several minor pieces.

Da'na, Charles Anderson, an American journalist, was born at Hinsdale, N. H., Aug. 8, 1819. From 1848 to 1862 he was managing editor of the *New York Tribune*, and from 1863 to the close of the Civil War, was assistant-secretary of war. In 1867 he founded the *New York Sun*, and began the successful management of that paper on Democratic lines. Together with George Ripley, he planned and edited the *New American Cyclopædia* and its revised edition, *The*


CHARLES A. DANA

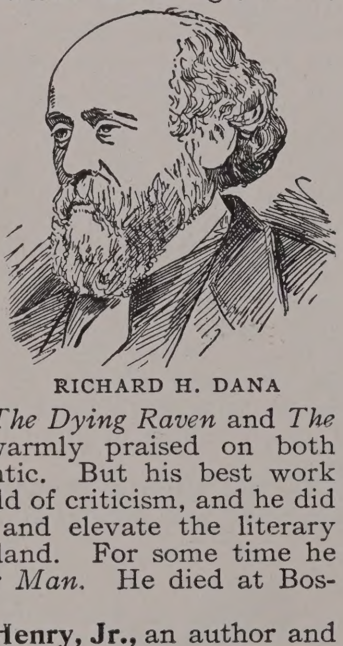
American Cyclopædia He died on Long Island, Oct. 17, 1897.

Dana, James Dwight, an American naturalist, was born at Utica, N. Y., Feb. 12, 1813. Graduating at Yale College, he was sent out in 1838 as a scientific observer in the United States exploring expedition under Wilkes, visiting the Antarctic and Pacific Oceans. During this expedition his ship was wrecked. He was for some time associate - editor of the *American Journal of Science*, and in 1846 became professor of natural history and geology in Yale. He gained worldwide distinction as a scientist. He published several works, among them *A Manual of Mineralogy* and a *Text-Book of Geology*. He died at New Haven, Conn., April 14, 1895.



JAMES D. DANA

Dana, Richard Henry, an American poet and essayist, was born at Cambridge, Mass., in 1787. After studying at Harvard, where he was concerned in a college-rebellion which prevented his graduation, he studied law. His tastes, however, were literary, and he soon became associate-editor of the *North American Review*. Some of his poems in this magazine, as *The Dying Raven* and *The Buccaneer*, were warmly praised on both sides of the Atlantic. But his best work was done in the field of criticism, and he did much to educate and elevate the literary taste of New England. For some time he published *The Idle Man*. He died at Boston in 1897.



RICHARD H. DANA

Dana, Richard Henry, Jr., an author and lawyer, was born in 1815. During his college-course he was compelled for a while to abandon his studies, because of a trouble with his eyes, and he shipped as a common sailor on a trip to California and back. This voyage he described in *Two Years Before the Mast*, the best book of the kind in the language. As a lawyer, he became distinguished and also did other literary work, including an edition of *Wheaton's International Law*. He died at Rome on Jan. 6, 1882.

Danaë (*dăn'āē*), according to Greek mythology, the daughter of Acrisius, king of Argos. The king confined her in a tower because it had been foretold that her son would kill him. Jupiter fell in love with her, and gained access to her room through the openings in the roof. She had a child by Jupiter, who was later called Perseus. Acrisius put her with her child into a chest, and the chest with its prisoners was thrown into the sea. The sea-goddesses conducted the chest safely to Seriphas, where Dictys took care of the wanderers and educated the child. Perseus finally fulfilled the prophecy by accidentally killing his grandfather.

Danaides (*da-nā'i-dēz*), in Greek story, the 50 daughters of Danaüs, who were married to the 50 sons of their uncle Ægyptus. Suspecting the sons of Ægyptus of treachery, Danaüs made his daughters promise to murder their husbands on their wedding-night. They all fulfilled this promise except Hypermnestra, who spared her husband, Lynceus. The Danaides were represented as condemned in Hades to pour water into sieves, in the vain endeavor to fill them.

Dan'bury, Conn., one of the capitals of Fairfield County, southwestern Connecticut, situated about 40 miles northwest of New Haven and 65 miles north-northeast of New York. It was settled in 1684, and was captured and burned by the British in 1777. Since then it has been noted for its manufacture chiefly of hats, being the first city to engage in this industry, and at present leading the U. S. Other manufactures are silver-plated goods, electrical goods and apparatus, art-metal ware, machinery, shirts, boots, shoes and sewing-machines. It has an excellent system of public schools, a state normal school, many beautiful churches, a public library and a city hospital. Population, 23,502.

Dan'delion. The common name of *Taraxacum officinale*, which belongs to the Composite family. It is a native of Europe and Asia, but has become naturalized throughout all temperate regions. Probably some of the Rocky Mountain forms are native. Its habit of persistent blooming and its characteristic globes of pappus are well known. Since it is prized for "greens" it has been cultivated and improved in Europe and in a few localities in this country. As a wild flower its distribution is general.

"Dear common flower that grow'st beside
the way,
Fringing the dusty road with harmless
gold."

It is a most persistent and hardy plant. Though the stem is short, the roots are long, the leaves so arranged that rain easily finds its way to the center and down to the roots. The stem is hollow, giving lightness and strength; the flower-head is made up of innumerable tiny flowers.

Bees, wasps, butterflies, beetles and flies—over a hundred insects—visit it for nectar and pollen. The seeming blossom of seed-time, the white, fluffy head, has given the plant the name of Blowball; and it is also called Peasant's Clock.

Dandolo (*dan'dō-lō*), a famous Venetian family, which gave four doges to the republic. The most illustrious of its members was Enrico, born about 1110. Eminent in learning, eloquence and knowledge of affairs, he ascended from one step to another until he was elected doge in 1192. As doge, Dandolo extended the bounds of the republic, fought and won many battles, marched at the head of the crusaders and subdued Constantinople. When the Emperor Alexius was murdered, Dandolo laid siege to Constantinople and took it by storm. He established there the empire of the Latins. He died at Constantinople in 1205. A later doge of Venice, Andrea Dandolo (1310-54), also achieved eminence.

Dane, Nathan, an American jurist, was born at Ipswich, Mass., Dec. 27, 1752, and died Feb. 15, 1835. A lawyer of high repute, he held many important public positions. But he is chiefly known through the Ordinance of 1787, which he drafted while a member of the Continental Congress. Dane also founded the Dane professorship of law in Harvard Law-School.

Dan'iel (a Hebrew word meaning God is judge) was a Hebrew prophet. According to the book which bears his name, he was descended from one of the highest families in Judah. As a youth he was carried captive to Babylon with three other Hebrew youths of rank. He and his companions were chosen for instruction in the language and literature of the Chaldeans, and the names of all four were changed—Daniel being called Belteshazzar; that is, prince of Bel. Not long after, he interpreted a dream for Nebuchadrezzar, and in consequence rose into high favor and was made governor of the province of Babylon and head-inspector of the priestly caste. This high position he kept under Darius and Cyrus, in spite of the intrigues of hostile courtiers. At one time, because he refused to give up the worship of God, he was cast into a den of lions, but was preserved and reached still higher rank. He assisted his people in their return to their native land. The book of *Daniel* was written partly in Hebrew and partly in Aramaic, and is now divided into 12 chapters, the first half consisting of narratives and the second half of predictions. The predictions are in the form of visions, which tell the story of four successive empires, perhaps the Chaldean, Median, Persian and Macedonian, culminating in the eternal kingdom of Christ.

Daniell, John Frederic, a noted English scientist, was born at London, March 12, 1790, and died March 13, 1845. He devoted himself to chemistry and meteorology, and wrote a number of essays, besides an *Introduction to Chemical Philosophy*. He was professor of chemistry in King's College, London, and received many medals and honors for his valuable scientific labors. He invented the hygrometer, a new pyrometer and the voltaic battery known by his name.

Dante (*dăn'tē*), **Alighieri,** the great poet of Italy, was born in 1265, in a house in the Place of St. Martin at Florence, which is still pointed out. As with many other great men, a halo of legend surrounds his early life; but he himself, in his *New Life*, tells the earliest known facts. When only nine years old, he met the Beatrice of his later poems and formed a passion for her from which he never swerved. It, indeed, influenced the whole course of his life. Dante took part in the military and political affairs of his time, when the fierce conflicts of the Guelphs and Ghibellines were tearing Florence to pieces. He rose to high office and was sent on an embassy to the pope at Rome in 1301, when the victory of the more extreme party at home resulted in the banishment of the leaders of the opposite party, Dante included; and later they were condemned to be buried alive, if caught. The remainder of the poet's life was spent in exile. He traveled about a good deal, living in Verona, Tuscany, Romagna and, finally, Ravenna, where he died on September 14, 1321, and was buried. The great work of Dante is the *Divine Comedy*, made up of three parts, giving a vision of Hell, of Purgatory and of Heaven. In it Dante gives a complete view of the highest culture and knowledge of the age on philosophy, history, classical literature, physical science, morals and religion; all this is expressed in the noblest and most exquisite poetry. This work really made the Italian language, which before was rude and unformed. No work in the world probably, except the Bible, has given rise to so much literature. It was copied in 600 different manuscripts, and about 300 printed editions have been issued; it has been more than 300 times translated into foreign languages; and unnumbered introductions, essays and commentaries have been written on or about it. Dante had not been in his grave 20 years before Italy instinctively recognized that this was her great man. About 50 years after Dante's death a public lectureship on the *Divine Comedy* was established at Florence, to which Boccaccio was first appointed. Another of Dante's works is the *Banquet*. Dante, as Boccaccio relates, was of moderate stature, stooping when he walked, slow and dignified both in gait and speech, reserved and silent in habit; but, when he spoke, keen and eloquent. He was devoted to music and painting. Boccaccio calls him "that singular splendor of the Italian race"; Carlyle: "the voice of ten silent centuries." See translations by Cary, Wright, Longfellow and Parsons-Norton. For life, character and works, see *A Shadow of Dante*, by Maria Francesca Rossetti.

Danton (*dăn'tŭn*), **Georges Jacques,** one of the great leaders in the French Revolution, was born at Arcis-sur-Aube, Oct. 28, 1759. A quiet, studious lawyer, practicing as an advocate in Paris, the fever of the times, however, soon filled his veins. Mirabeau quickly recognized his genius, and Danton became the leader of the populace. Along with Marat and Camille Desmoulins, he founded the Cordelier's Club, which soon became the rallying-point of all the hotter revolutionists. His harsh and daring countenance, his beetling black brows and voice of enormous power, thundering against the aristocrats, roused the people to fury. He became minister of justice, and for some time was the leading spirit of the Revolution. He roused the people of Paris to send forth armies to repel invaders from the soil of France. He probably had a share in the September murders in the prisons. He voted for the death of Louis XVI, and was a member of the committee of public safety. He succeeded in crushing the moderate party; but he could not restrain the forces he had created, and he himself at last fell a victim to the guillotine. The Mountain, as the ruling party was now called, saw a bloodier leader in the narrow and bitter Robespierre. When arrested, Danton showed no fear, but treated his judges with a contempt which hastened his doom. When asked his name before the bar of the tribunal, he replied: "My name is Danton, a name tolerably known in the Revolution; my abode will soon be annihilation; but I shall live in the Pantheon of history." He was guillotined on April 5, 1795. To the headsman he remarked: "Thou wilt show my head to the people; it is worth showing." See Carlyle's *French Revolution*.

Dantzic (*dant'zik*), formerly capital of West Prussia, but since 1918 a free city under the control of the League of Nations and forming part of Poland's corridor to the Baltic, four miles from the Vistula's mouth, in the Gulf of Dantzic, an inlet of the Baltic. Dantzic was an important town in the 10th century, and passed through various hands. Since 1793 it has been a city of Prussia, except during the time of Napoleon, when it existed as a separate dukedom. Several old churches and monasteries, with the town-hall and exchange, are the chief buildings. Dantzic was at one time a prominent member of the Hanseatic league, and is still one of the chief commerical cities of northern Europe. Besides its large trade by sea, river and railroad, there are many manufactures, including beer, sugar, tobacco, iron-works, etc. There is a library of 100,000 volumes. Population, 170,347.

Dan'ube, the second river of Europe, inferior only to the Volga. It is formed by the Brege and the Brigach, two mountain-streams rising in the Black Forest in Baden and uniting at Donaueschingen, 2,264 feet above sea level. At Ulm, the head of steam navigation, its elevation is about 1,500 feet; at Vienna 500 ; at Budapest 350; and at Moldova 200 feet. The Danube has a total length, including windings, of 1,740 miles, and drains an area estimated at 315,000 square miles. There are 400 tributaries, 100 of them navigable. There are three principal divisions of the river-basin. The upper course ends at Passau, where the river leaves German territory. At Passau its width is 231 yards and its depth 16 feet. The river then enters Austrian territory, and for some distance its scenery rivals that of the Rhine. It passes into Hungary southeast of Vienna, then making a sharp turn to the southward it enters Jugo-Slavia, after which it turns to the east and forms the boundary between Rumania and Bulgaria. Near Belgrade it broadens until it is 1706 yards wide.

Within a stretch of only seventy-five miles, beyond Ujpalanka are eight distinct rapids, shut in by lofty walls. The lower Klissura is the most strikingly picturesque of these; but the most difficult passage is the shortest (one and a half miles), the Iron Gate, below Orsova, where the middle course of the river ends. Here the stream has a breadth of only 129 yards, and the piled-up waters reach a depth of 28 fathoms; ledges of rock lift their tooth-like points above the surface; and all around a seething stretch of whirlpools, cataracts, eddies and counter-eddies combines with the river's rapid fall to present a serious and, formerly, impassable obstacle to navigation. Thence the lower course passes in a wide stream till it divides into the delta, through which it pours its waters into the Black Sea. The delta is a vast wilderness, covering an area of 1,000 square miles, and resembling an immense green sea of rushes; it is cut up by numerous channels and lakes, and is the haunt of sea-birds, wolves and buffaloes. The farthest mouths are 60 miles apart. The three main channels are the Kilia, St. George and Sulina. It is by the Sulina mouth that ships enter, although it discharges only two twenty-sevenths of the river's waters. The Danube is of great commercial importance. One company alone, which does a large business on its waters, has nearly 200 steamers and over 700 towboats. The Danube is connected with the Rhine by Ludwig's Canal, and with the Elbe by the Moldau, Mühl and other canals. Since 1856 the

Danube has been free to all nations. In that year was appointed the International Danube Navigation Commission, made up of delegates of all the great powers. It has almost absolute power over the mouths of the Danube and as far inland as the Iron Gate. It has already made many improvements. It has its own flag, uniform and revenue; has made laws; and keeps its own small army of police.

Danvers, Essex County, Mass., five miles from Salem on the Boston & Maine railway, has shoe, leather, incandescent lamp, brick, and rubber factories. St. John's Normal College, the Essex County Agricultural School, the Danvers State Insane Hospital, and the Page House (now occupied by the Danvers Historical Society and noted as an example of early Colonial architecture) are located here. The town also has a public library founded by George Peabody in 1852, good schools and miles of fine macadam roads shaded by magnificent elm trees. Population, 10,000.

Danville, Ill., like most of the towns in this state, is a flourishing center, and has an extensive trade in the mining and shipment of coal, taken from the contiguous bluffs. It is the capital of Vermilion County, and lies on the Vermilion River, 120 miles south of Chicago. It has a national soldiers' home, a high school, several churches, three national banks and daily newspapers, iron-foundries, planing-mills, carriage, wagon, organ and furniture-factories, together with the car and machine-shops of the Chicago, Danville & Vincennes Railroad. Its population has increased some 11,000 in the past decade, and now numbers 40,000.

Danville, Pa., a borough, the county-seat of Montaur County, on the northern branch of the Susquehanna River (with a bridge here spanning the stream), also on the Phila. & Reading and the D. L. & W. railways 41 miles southwest of Wilkes-Barre. It is the seat of the state hospital for the insane, has a good public library, and owns and operates its own water-works. In the neighborhood are coal, iron-ore and limestone deposits; while its industrial establishments embrace stove-works, rolling-mills and extensive blast-furnaces. Population, 7,517.

Danville, Va., a thriving town and important tobacco center in Pittsylvania County, southwestern Virginia, situated on the Dan River falls, 65 miles south of Lynchburg and 140 miles southwest of Richmond. It is at the junction of the Richmond, Danville and Norfolk Division of the Southern Railway and of the main line of the Danville and Western. The river furnishes power for cotton-mills, flour-mills, foundries and an electric-light "plant," and further development of its power has been made at a cost of $2,000,000. Danville is the largest loose-tobacco market in the world, having 150 tobacco-factories and manufacturing nearly 40,000,000 pounds of tobacco annually. It is the seat of Roanoke Female College (Baptist), Randolph-Macon Institute for young ladies (Methodist) and Danville Military School. Danville has a good public school system, churches, a general hospital and seven banks. Population, 25,000

Daphne (*dăf'nē*) in the Greek myths was a river-nymph, the daughter of Gæa, goddess of the earth, and a river-god. In answer to her prayer to Zeus, Daphne was changed into a laurel, and so escaped the pursuit of Apollo, her wooer. Her lover, Leucippus, had been slain by the nymphs through the jealous wiles of Apollo. *Daphne* in the Greek means laurel.

Dardanelles (*där'dȧ-nĕlz'*), the ancient Hellespont, a narrow channel separating Europe from Asia and uniting the Sea of Marmora with the Ægean archipelago. The name is derived from the ancient city of Dardanus in the Troad. The strait has a length of about 45 miles, running from northeast to southwest, and a breadth of from one to four miles. From the Sea of Marmora a strong current runs through it. Both sides are strongly fortified. Since 1841 it has been agreed by the five great powers and Turkey that no ship of war belonging to any nation, save Turkey, should pass through the Dardanelles without the express consent of Turkey. Though nominally closed to the passage of foreign war-vessels, some modification of the prohibitory edict was in 1891 made by Turkey in favor of Russia. The Dardanelles are celebrated in ancient history by the passage of Xerxes in 480 B. C. to enter Europe and of Alexander in 334 B. C. to enter Asia. Both crossings took place near Abydos. See ABYDOS and BOSPORUS.

Dare, Virginia, the granddaughter of John White, whom Raleigh had sent in 1587 to found a settlement in Virginia, was the first child to be born of English parentage in America. The date of her birth was a few weeks after the expedition had landed, in the summer of 1587.

Darfur (*dähr-fōōr*) is a semi-independent Moslem state in Central Africa, bounded on the north by the Sahara, on the east by Egyptian Sudan and Kordofan, on the south by Bahr-el-Ghazal, on the southwest by French Congo and on the west by Wadai. It pays tribute to the Egyptian government, but its affairs are entirely within the control of its sultan for the present. Area, 170,000 square miles; capital, El Fasher; population, 1,500,000.

Da'rien, Isthmus of. See PANAMA.

Dari'us, the name of three kings of Persia, the greatest of whom was Darius I, who ruled from 521 to 485 B. C. He was the son of Hystaspes, and succeeded to the Persian throne after putting to death the usurper Gaumata, who had given himself out to be

Smerdis, the brother of Cambyses, and had seized the throne. Accurate accounts of the reign of Darius are given by means of a monument of his time, the famous inscription on the rock of Behistun. For years he had to contend with revolts in various parts of his empire. Babylon revolted twice, and the first time it resisted him for nearly two years. He organized the Persian empire, removing the seat of government to Susa, and dividing his dominions into 120 satrapies. He did much to improve the internal administration, and encouraged commerce and the arts by useful institutions and laws. He pushed his conquests as far as the Caucasus and the Indus. In 508 he had an admiral explore the river. He made an expedition against the Scythians, crossing the Bosporus on a bridge of boats, and subdued Macedonia and Thrace. He made two expeditions against Greece. In the first his fleet was wrecked at Mount Athos in 492, and in the second he was defeated at the battle of Marathon in 490. An Egyptian revolt also disturbed the latter years of his reign. Under Darius the Zoroastrian faith became the state-religion. Darius favored the Jews, and under him the second temple was built, being completed in the sixth year of his reign (515). He was succeeded by Xerxes.

Dar'ley, Felix O. C., a noted American artist, was born at Philadelphia, June 23, 1822, and died March 27, 1888. He early took to drawing with such success as to encourage him to devote himself entirely to art, especially in the form of book illustrations. Among his best known works are his outline drawings to Irving's *Legend of Sleepy Hollow* and *Rip Van Winkle*. He illustrated Cooper's and Dickens' novels, with many other works. Some of the finest figures and scenes on the government bonds and legal-tender notes were designed by him. He also turned out some larger works. After a foreign trip he brought out *Sketches Abroad with Pen and Pencil*.

Dar'ling, Grace, a name famous in the annals of heroism, was the daughter of William Darling, lighthouse-keeper on Longstone, one of the Farne Islands, and was born at Bamborough, Nov. 24, 1815. On the morning of Sept. 7, 1838, a vessel was wrecked at Harker's Rock among the islands, and was seen by Grace Darling from the lighthouse, lying a wreck on the rocks. By wonderful strength and skill she and her father brought their boat to where the nine survivors were clinging, and within a few hours all were saved. The risk was great, and the feat required great daring. Grace Darling was loaded with honors and presents, but died soon after of consumption on Oct. 20, 1842.

Darling River, a tributary of Murray River, in Australia. It is formed by the union of several headwaters, all of which rise in the great dividing range. Its length, with its tributaries, is estimated at 1,160 miles, and the system thus formed drains an area of 198,000 square miles. It joins the Murray at Wentworth, on the borders between New South Wales and South Australia. Darling also is the name of a mountain-range and of two districts in Australia

Darmstadt (*därm'stät*), a city of Germany, capital of the grand-duchy of Hesse-Darmstadt, lies on the small River Darm, 15 miles south of Frankfort-on-Main. There are several public squares and five public gardens and promenades. Among other buildings there are two palaces. The old ducal palace contains museums of paintings, natural history, etc. In Prince Charles' palace is Holbein's famous *Meyer Madonna*. There are a good trade and a number of manufactures; but the town depends more on its ducal court and government offices than on its industries. Population, 87,085.

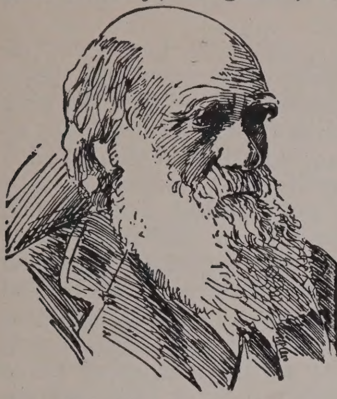
Darnley. See Mary, Queen of Scots.

Darrah, Mrs. Lydia, a Quaker heroine of the Revolutionary War, residing in Philadelphia in 1777, during the British occupation. From this patriot lady the English adjutant-general, the story goes, rented one of her rooms for a conference with his brother-officers; and, suspecting some plot against Washington's army, then near-by, Mrs. Darrah, it seems, overheard an order dictated to attack Washington's troops at White Marsh on Dec. 4. The information gleaned enabled Mrs. Darrah to give warning of the projected attack, and that at a critical moment, with the result that Washington was prepared to meet the British design and entirely nullify its results.

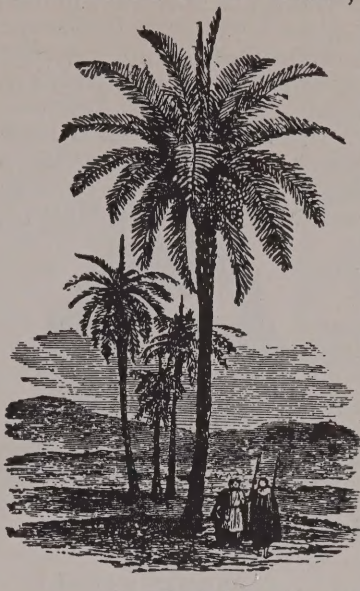
Dart'moor, a desolate upland in Devonshire, England, the source of all the principal rivers of the county. It is remarkable for its wild and rugged scenery, its trackless wastes and its mineral products. Its extreme length from north to south is 25 miles, and from east to west 20. The hills are called *tors*, and usually have crests of granite, worn by the weather into odd shapes. There are many rude stone-antiquities, earthworks and cyclopean bridges. The principal mineral products are tin and china-clay or kaolin. Dartmoor is chiefly noted as the site of a prison, built in 1806, for the custody of French prisoners of war. On the breaking out of the War of 1812, 2,500 impressed sailors, claiming to be American citizens and refusing to fight against their country, were imprisoned here, and most of them kept until the end of the war. Accounts of their harsh treatment caused much bitter feeling in the United States. The prison inclosures occupy an area of 30 acres, encircled by a double line of lofty walls. The prison now is a convict-depôt.

Dart'mouth College. See Hanover.

Dar'win, Charles Robert, one of the world's greatest naturalists, was born at Shrewsbury, England, Feb. 12, 1809. He studied at Edinburgh University and at Christ's College, Cambridge. Both Darwin's father and grandfather were naturalists, and he early became interested in the same line of study. At the close of 1831 he sailed as naturalist on the *Beagle.* On this voyage, which lasted five years, he gained a knowledge of the animals, plants and rocks of many countries, which equipped him for his future studies. His *Journal,* giving his observations while on the *Beagle,* was published in 1839. In the same year Darwin married and settled upon his country-estate. He devoted himself largely to the problem of the origin of species, the different kinds of animals and plants. This work he carried on in spite of distressing sickness. After five years' work "he allowed himself to speculate" on the subject, and drew up some short notes. He was a cautious student, and his conclusions were not published till 1859. That year his *Origin of Species* came out. It made such a stir in the intellectual world that it is in some ways the most important book of the 19th century. In it he attempts to explain the way in which species have been evolved through a process of *natural selection,* or survival of the fittest, in the struggle for existence. We should avoid the common error of supposing that Darwinism is the same thing as evolution. His theory of *natural selection* is merely one explanation of how the evolution of life was brought about. (See EVOLUTION.) The book was received with great interest throughout the world, and was violently attacked and defended, but to-day has become accepted in the main by theologians, scientific men and philosophers. Darwin published a number of other books. His kindliness of character, honesty of purpose, devotion to truth and attachment to his friends made him loved wherever known. He died on April 19, 1882. See his *Life and Letters,* by his son, Francis Darwin, who has become a great and famous astronomer. See also "The Debt of Science to Darwin" in *The Century Magazine,* Vol. XXV, 1883.


CHARLES ROBERT DARWIN

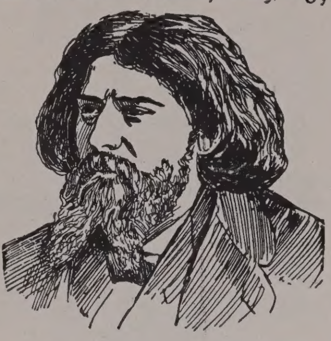
Date, the fruit of a well-known palm, *Phœnix dactylifera,* which is native to northern Africa and Arabia, and is more or less cultivated in other tropical and subtropical regions. It is one of the most common food-articles of the Arabs, and other parts of the plant furnish them with materials for various purposes. The tree becomes 100 feet high, having a straight, rough trunk, and is said to bear its enormous clusters of fruit for one or two centuries. The date-palm has been cultivated in the Spanish parts of North America for many years, but chiefly for decorative purposes. The only part of the United States suitable for growing the tree for commercial purposes is said to be southern Arizona and southern California, where some interesting experiments are being made and considerable success has already been attained. Dates rank very high as food, and are eaten both fresh and dried. In the date-palm staminate flowers are borne on one tree, pistillate ones on another. To insure perfect pollination the Arabs cut off sprays of staminate flowers and place them in the pistillate trees. The tree is propagated by seeds and by suckers; if a certain variety is desired, suckers are used; the date is like the apple in not growing true to seed.


DATE-PALM

D'Aubigne' (*dō-bēn-yā'*), **Jean Henri Merle,** the great Swiss historian of the Reformation and Evangelical divine, was born near Geneva, August 27, 1794; and died there, Oct. 20, 1872. He studied theology at Geneva and in Berlin, where he had Neander as his instructor, and for a time held pastoral charges at Hamburg and at Brussels, and at the latter city was preacher to the court. Returning to Geneva, he became professor of church-history in its theological seminary, and here wrote his famous *History of the Reformation in the Sixteenth Century,* his *History of the Reformation in Europe in the Time of Calvin* and works on Lutheranism and Christianity. His works on the Reformation have raised a monument to his name. They, however, are the work, not of a judge, but of an advocate.

Daubigny, Charles François (*frän-swä' dō'bēn'yē'*), a French etcher and landscape-painter, was born in 1817. He studied with his father, with Delaroche and with others, exhibited when only 21, but did not receive full recognition for 28 years He devoted himself to close and sympathetic study of nature, working much from a houseboat on the Seine, and painted landscape with originality, naturalness and fidelity. He also became a vigorous etcher, frank in method and retaining the painter's freedom. The *Pool of Gylien* and the *Rising Moon* rank with his best pictures. He died in 1878.

Daudet (*dō'dắ'*), **Alphonse,** a modern French novelist, was born at Nîmes, May 13, 1840. His first literary work was in the line of poetry, and he spent some years writing for the stage. To *Figaro* and other journals he contributed some of his best work. One of his most noted early works is *Tartarin of Tarascon*, a most amusing satire on the characteristics of the natives of the south of France, which he followed by a second part, *Tartarin on the Alps*. Many of his later works exhibit a rich pathos, as in *Jack*. His writings generally are vigorous and lively. He died at Paris, on Dec. 16, 1897.


ALPHONSE DAUDET

Daughters of the American Revolution, a patriotic society organized by and for women, Oct. 11, 1890, with headquarters in the City of Washington and to-day having a membership in the various chapters of the order throughout the states, territories and dependencies of the Union, as well as in England, Canada and South Africa. The design of the society is to perpetuate the memory of those who took part in achieving American independence, to collect and preserve relics of the historic era and to erect monuments of notable patriots on eligible historic sites. Membership in the society is restricted to "women who are lineal descendants of an ancestor who was a military, naval or marine officer, soldier, sailor or marine in actual service under the authority of any of the 13 colonies or states or of the Continental Congress and remained always loyal to such authority, or descendants of one who signed the Declaration of Independence, or one who, as a member of the Continental Congress or the congress of any of the colonies or states or as an officer appointed by or under the authority of any such representative bodies, actually assisted in the establishment of American independence by service rendered during the War of the Revolution, becoming thereby liable to conviction of treason against the government of Great Britain, but remained loyal to the authority of the colonies or states." The society is incorporated, publishes a monthly periodical, and, besides its headquarters at the national capital, has chapters throughout the country, with a total membership (1908) of over 40,500.

Dauphin (*da'fĭn*), the title given to the eldest son of the king of France, the heir-apparent to the throne. The title in this form originated with Humbert II, Lord of Viennois, in 1349. Humbert died childless, and transferred his possessions to Charles of Valois on condition that the heir-apparent to the throne of France bear the title of Dauphin of Viennois. Dauphin was a title earlier held by some of the feudal lords of France who wore dolphins upon their helmets, or used them as a family crest.

Davenport, a city of Iowa ranking third in the state in population, is located on the Mississippi, 183 miles west of Chicago. The site was formerly occupied by an Indian village, and was visited by Père Marquette and Louis Joliet in 1673. The city was incorporated in 1838, and the first school was established in the same year. The population, which was 1,848 in 1850, has now increased to over 60,000 Davenport is largely a manufacturing city, the capital invested in manufactures being $15,000,000, and the men employed 8,000. The value of the output in lumber, metal-wheels, railroad equipment, wagons, cigars, pearl-buttons and other manufactures now exceeds $18,000,000.

Davenport is at the western terminus of the Hennepin Canal, and is on six railways. It has all the institutions and agencies of the most advanced cities. Among the public institutions are Iowa Soldiers' Orphans' Home, C. C. Cook Home for the Friendless, St. Vincent's Orphanage and the Home for Old Farmers. A $75,000 public library has been erected through the munificence of Andrew Carnegie. The city has five semipublic libraries.

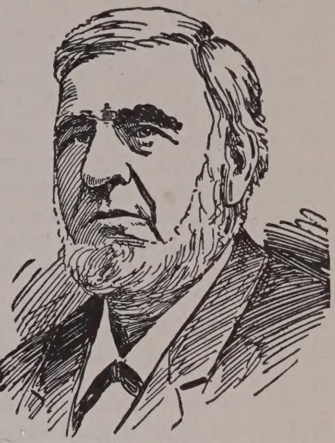
Davenport has five miles of river frontage and a model water-service with the largest filter-plant in the world. It is the see-city of the Roman Catholic and Episcopal denominations. The museum of the Academy of Sciences has the largest collection of relics of mound-builders extant. Its public-school system is up-to-date in every respect, and has a large enrollment. Other schools are St. Katharines Hall; St. Ambrose College; the Academy of the Immaculate Conception; and parochial and private schools.

Davenport forms with Rock Island and Moline a community of 110,000 people whose social interests and commercial advantages are like those of the citizens of one place.

Da'vid, meaning beloved, the second king of Israel. He sprang from the family of Judah, and was the youngest son of Jesse. He is described as a handsome youth, "red-haired, with beautiful eyes and fair face," when he first distinguished himself in Israel by slaying the Philistine giant, Goliath. Because of his heroic deed, or because of his skill with the harp, Saul took him to his court and gave him a military command. But the king became jealous of him, and he had to flee. In the cave of Adullam, near Gath, he gathered a band of 400 freebooters, which afterward increased to 600, with which he ranged through the country, never attacking the king or his countrymen, but always their enemies. He had difficulty in avoiding the king's expeditions sent against him, and finally left Judah, becoming vassal of the Philistine king of Gath. After the death of Saul and Jonathan, at Gilboa, David reigned seven and one-half years in Hebron over Judah, and on the death of Ishbosheth he was chosen king of all Israel. He conquered the independent city of Jebus (Jerusalem), and made it the center of his kingdom, building a palace for himself on the highest hill, Zion, and placing the ark of the covenant there under a tent. In the course of a few years the conquest of the Philistines, Moabites, Arameans, Edomites and Ammonites reduced the whole territory from Egypt to the Euphrates. In the last year of his long reign of 32 years in Jerusalem, there were popular troubles and two rebellions under his sons, Absalom and Adonijah. He died between 1018 and 993 B. C. David is by far the greatest of the kings of Israel. He was courageous and skillful in war and prudent and far-seeing in government. He also was the greatest poet of his time, and the founder of the religious lyric poetry of the Hebrews—"the sweet singer of Israel."

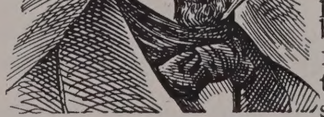
David (*dä-vid*), **Jacques Louis,** a French painter, was born at Paris, Aug. 31, 1748. Before the Revolution he had produced many celebrated works, among them the *Oath of the Horatii* and *The Death of Socrates.* In the Revolution he took a prominent part; voted for the death of the king; was the artistic decorator of the great national fêtes of the Republic, which were founded on classical customs; and narrowly escaped with his life. When the Bourbons were restored, he was banished to Brussels, where he died, Dec. 29, 1825. His masterpiece, probably, is *The Rape of the Sabines.*

Davis, Cushman Kellogg, late United States senator for Minnesota, was born at Henderson, N. Y., June 16, 1838; and died at St. Paul, Minn., Nov. 27, 1900. Graduated at the University of Michigan, he studied law and practiced in Wisconsin, joining one of its infantry-regiments at the outbreak of the Civil War as lieutenant. In 1867 he was elected to the Minnesota legislature, and in 1868 became United States district-attorney for his state, and then governor (1874-75). In 1887 he took his seat in the United States senate, where he served until his death. He long served as chairman of the senate committee on foreign relations, one of whose acts was to declare war against Spain in 1898; and later was a member of the peace-commission to Paris. He was the author of *The Law in Shakespeare.*


JUDGE DAVID DAVIS

Davis, David, an American jurist and statesman, was born in Cecil County, Md., March 9, 1815, and died at Bloomington, Ill., June 26, 1886. After graduating from Kenyon College, Ohio, he studied law in the east, and began practice in Bloomington, Ill., where he made his home. In 1844 he was a member of the state legislature and four years later was appointed to the bench as judge of the eighth judicial district of Illinois. In 1862 President Lincoln, whose executor and intimate friend he had become, appointed him a justice of the United States supreme court; in 1877 he resigned to enter the United States senate, and in 1881 was chosen president of the chamber. Though nominally independent in politics Judge Davis usually voted with the Democrats. In 1883 he resigned his seat in the senate, and died three years later.

Davis, Henry Winter, American politician, was born at Annapolis, Md., Aug. 16, 1817, and died at Baltimore, Dec. 30, 1865. He practiced law in Virginia, and in 1854 was elected to Congress, where he served almost continuously till his death and was chairman of the committee on foreign affairs. He was a Republican in politics, and in 1860 was offered the nomination for the vice-presidency, but refused the honor. He strenuously advocated the emancipation of the slaves and the extension to them of the rights of suffrage.


JEFFERSON DAVIS

Da'vis, Jefferson, was born in Christian (now Todd) County, Ky., June 3, 1808. He received an appointment from President Monroe to West Point, where he was graduated in 1828. After serving in the Black Hawk War, he left the army and engaged in cotton-planting near Vicksburg, Miss. In 1845 he was elected to Congress, but resigned his seat the next year to take part in the Mexican War. As colonel of the First Mississippi Volunteers, he fought under General Taylor at Monterey and at Buena Vista, where he was severely wounded.

Mr. Davis was elected to the United States senate in 1847, resigning his seat in 1851. In 1853 he became secretary of war under President Pierce. In 1857 he again entered the senate, where he became a leader of the Democratic party and a champion of slavery and of state-sovereignty. He resigned his seat when Mississippi seceded from the Union, and was elected president of the Confederate States when that government was organized, Feb. 18, 1861. In 1862 he was re-elected to this office for a term of six years. By reason of his official position, as well as by his ability and force of character, his was the guiding hand in the long struggle. He was unwilling to give up when the cause had become hopeless. In his last message, dated March 13, 1865, he declared that, in spite of reverses, success might yet be secured. Lee surrendered at Appomattox in less than 30 days after this. On the approach of the Federal army Mr. Davis left Richmond, and, after a conference with Generals Johnston and Beauregard at Greensboro, N. C., he set out with an escort westward through Georgia. He was captured at Irwinville in that state, May 10, by a detachment of Federal soldiers under Lieutenant-Colonel Pritchard. He was confined at Fortress Monroe for two years, was indicted for treason in 1866, was admitted to bail May 13, 1867, but was never brought to trial. He lived in retirement until his death, at New Orleans, La., Dec. 6, 1889. In 1881 he published *The Rise and Fall of the Confederate Government.*

Davis, John Chandler Bancroft, American jurist and diplomat, was born at Worcester, Mass., Dec. 29, 1822. After graduating at Harvard, he studied law and began to practice in New York. Early in his career he was secretary of the United States legation at London, and acted as American correspondent of the London *Times.* In 1869, he became a member of the New York legislature. In the same year he was appointed assistant-secretary of state, and acted as agent of the government at the Geneva court of arbitration in the settlement of the *Alabama* claims. From 1874 to 1877 he was United States minister to Germany, and from 1878 to 1882 was judge in the United States court of claims. Latterly he has held the post of reporter for the United States supreme court. He has published *The Massachusetts Justice, Treaties of the United States* and numerous volumes of reports.

Davis, John W., a man who by his own efforts had risen from life in a small West Virginia town to become Solicitor General of the United States, Ambassador to Great Britain, and head of one of the greatest law firms in America, was the choice of the Democratic National Convention for the presidency. Although it took two weeks of voting and 103 ballots finally to name the nominee on July 9, 1924, and though he was defeated at the election of the following November, all factions agreed that no other candidate would have been so well able to unite the elements of the party. That Mr. Davis is a man of exceptionally wide culture and ability was conceded by all parties.

His service in the National House of Representatives during his two terms gained him such a reputation for brilliancy that in 1913 he was appointed Solicitor General of the United States by President Wilson. His career as Ambassador to Great Britain from 1919 to 1921 was equally distinguished.

Mr. Davis was born in Clarksburg, West Va., on April 13, 1873. In 1892 he was graduated from the undergraduate department of Washington and Lee University, Lexington, Va., and in 1895 from the Law School. After his return from Great Britain in 1921, he became the leading member of the law firm of Stetson, Jennings and Russell of New York City. In 1922 he was elected President of the American Bar Association.

Davis, Richard Harding, American novelist and journalist, son of the preceding, was born at Philadelphia, April 18, 1864, and educated at Lehigh and Johns Hopkins Universities. He began life as a reporter and correspondent for New York newspapers, and in 1888 became connected with the New York *Sun,* to which he contributed his early stories. He traveled considerably, and was managing editor for a number of years of *Harper's Weekly.* His descriptive powers were excellent, as shown in his *Three Gringoes in Central America* and *The West from a Car-Window.* Others of his publications include *Gallagher and Other Stories; Our English Cousins; Cuba in War-Time; The Rulers of the Mediterranean;* and a book on the Boer War. He died April 11, 1916.

Davis Strait washes the western coast of Greenland, and joins Baffin's Bay to the Atlantic Ocean. At its narrowest point, just north of the Arctic circle, the Strait measures about 200 miles across. Ginnunga Gap, spoken of in the old Norse sagas, is now known to be Davis Strait.

Davitt, Michael (1846–1906), Irish patriot and, with Mr. Parnell, founder of the Irish Land-League, was born of poor parents who were evicted from their Irish homestead when Davitt was a youth. He was connected with the Fenian brotherhood, imprisoned, and unseated from Parliament by petition when elected to that office. His books include a *Defense* of the Irish Land-League, and *Leaves from a Prison-Diary.*

Davy, Sir Humphry, an eminent British scientist and inventor, was born at Penzance, Cornwall, England, on December 17, 1778. His father, a woodcarver, died in 1794, leaving a widow and five children penniless. Young Davy, who had developed a love for story-telling and scientific experimenting at school, was apprenticed at the age of sixteen to a surgeon-apothecary at Penzance, that he might be fitted to earn a living and aid in the support of the family. He wrote poetry, but at the age of nineteen had become deeply interested in chemistry. He was an assistant at a scientific school in Clinton. In 1798, when Dr. Thomas Beddoes established a "medical-pneumatic institute" at Bristol, he chose Davy as assistant, and later as superintendent. In 1799, while becoming acquainted with Coleridge and Southey, and thus indulging his love for poetry, he also published papers on heat and light, and on a defense of the prevalent corpuscular theory of light. In that same year, experiments in breathing gases almost cost him his life, but he proved that pure nitrous oxid "laughing gas" was respirable. In 1800 he published *Researches concerning Nitrous Oxid,* which brought him fame. In 1801 he became lecturer at the Royal Institution of London, where his eloquence and brilliant experiments made him popular to large audiences. By 1803 he was a famous lecturer, talking to as many as 1,000 people at a time. His discoveries in agricultural chemistry were important, and formed the foundation for his ten years of lectures on that subject. He made a special study of tanning. His fame rests largely, however, on his advanced views of the science, first announced in his lecture *On Some Chemical Agencies of Electricity.* Following out the principles in this essay, he discovered that alkalies and earths are compound substances formed by oxygen combined with metals. He discovered the element potassium, and several others, including barium, calcium, strontium, and magnesium. He was knighted in 1812. In 1815 he began the study of the nature of fire-damp, which resulted in his invention of the safety-lamp, a boon to miners. He was made a baron in 1818. In 1820 he was elected president of the Royal Society. He discovered the talents of Faraday and obtained his appointment as assistant in the laboratory of the Royal Institution. In 1826 Davy suffered a stroke of paralysis. He died on May 29, 1829, while on his way to Geneva where he believed he might regain his health. In addition to the works previously mentioned, he was the author of *Elements of Chemical Philosophy* (1812); *Salmonia* (1827), and *Consolations in Travel,* published posthumously in 1831.

Dawes, Charles Gates, an American statesman and financier, was born in Marietta, Ohio, on August 27, 1865, the son of General Rufus R. and Mary Beman (Gates) Dawes. He was educated at Marietta College from where he was graduated in 1884. During his summer vacations he worked on the Marietta, Columbus and Northern Ohio Railway. He proved so efficient in his work that he was made chief engineer of an Ohio railway. In 1886 he was graduated from the Cincinnati Law School. Upon reaching the age of twenty-one he was admitted to the bar. In 1887 he received his A.M. from Marietta College. A short time later he removed to Lincoln, Nebraska, where he began the practice of law. It was the Nebraska rate case, in which the young attorney represented the Board of Trade of Lincoln, that helped Charles G. Dawes to establish his reputation.

In 1889 he was married to Caro D. Blymyer of Cincinnati. Four children were born to them, three of whom are still living. In 1894 Mr. Dawes discontinued his legal practice and moved to Evanston, Illinois. There he became an organizer of public utilities.

In 1896 he organized the Illinois movement to nominate McKinley for President of the United States. He became a member of the Republican National Committee, and after McKinley had been elected President, Charles G. Dawes was appointed Comptroller of the Currency, which office he held until 1901. He retired to organize the Central Trust Company of Illinois, which became one of the strongest financial institutions in Chicago.

Upon the entrance of the United States into the World War, Charles G. Dawes volunteered for service. He was commissioned Major of the United States Engineers in June, 1917, and served on the administrative staff of General Pershing. In 1918 he was promoted to brigadier-general, and became general purchasing agent of the A.E.F., later being appointed as United States member of the Military Board of Allied supply, under General Foch. After the armistice, he was a member of the Liquidation Commission until his resignation in August, 1919.

After the close of the war, General Dawes was awarded the Distinguished Service Medal by the United States, and decorated by Great Britain, France, Italy and Belgium for his war services. In 1921 he was appointed first director of the new Bureau of Budget under President Harding. In this office he was insistent that bureaus and departments observe the utmost economy under the initial Federal budget. During the first year of his service he saved $250,000,000 in government expenditures. He resigned his position on June 30, 1922, after having established the budget on a permanent and satisfactory basis. In November of that year he was elected director of the Chicago and Great Western Railway.

In 1923 General Dawes was appointed by the War Reparations Commission as United States member of a committee to report on balancing Germany's budget and stabilizing her currency, to afford a means of settling the question of reparations. The result was the famous 'Dawes Plan' which was ratified and accepted by all the Powers concerned. In recognition of this valuable service he was awarded the Nobel Peace Prize in 1925, jointly with Sir Austen Chamberlain. General Dawes presented his share of the prize to the endowment of the Walter Hines Page School of International Relations.

In 1924 he was elected Vice-President of the United States by the Republican Party. From 1925 until 1929 he occupied this national office, during which time he tried to hasten the Senate procedure by limiting debate. In 1929 he was made chairman of the Economic Committee of American Experts visiting Santo Domingo. He served as Ambassador Extraordinary and Minister Plenipotentiary to Great Britain from 1929 to 1932. He was president of the Reconstruction Finance Corporation from February 1, to July 6, 1932. In that year he retired to return to his banking interests. He became a member of the finance committee of 'A Century of Progress Exposition' in 1929.

General Dawes is noted for his philanthropic interests, among which are the Rufus F. Dawes hotels for impoverished men, established in Chicago and Boston in memory of his son, Rufus Fearing Dawes, who was drowned in 1912; and the Mary Gates Dawes Memorial Hotel, for women, in memory of his mother. He is an accomplished musician on piano and flute, and composer of *Melody in A Major.* His literary works include: *The Banking System of the United States* (1892); *Essays and Speeches* (1915); *A Journal of the Great War* (1912), and *The First Year of the Budget of the United States* (1923).

See Dawes Plan.

Dawes, Rufus Cutter, a prominent American public utilities magnate and President of the 'Century of Progress Exposition' held in Chicago in 1933 and 1934, was born in Marietta, Ohio, on July 30, 1867, the son of General Rufus R. and Mary Beman (Gates) Dawes. He is a brother of the distinguished Charles Gates Dawes. He was educated at Marietta College, graduating from that institution in 1886. He received his A.M. degree from that college in 1889.

On June 3, 1893, he married Helen B. Palmer, and established residence in Evanston, Illinois. Mr. Dawes has led an intensive business life in organizing and managing gas and electric companies. He was a member of the Illinois State Pension Laws Commission in 1918 and 1919, and a delegate to the Constitutional Convention in 1920. He was appointed adviser to the American members of the committee of experts who prepared the 'Dawes Plan,' and served as assistant to Owen D. Young, first agent of general reparations. Since 1927 he has been president of 'A Century of Progress Exposition.' In 1931 Northwestern University conferred the honorary degree of LL.D. upon him. He is the author of *The Dawes Plan in the Making.*

See Century of Progress.

Dawes Plan, a reparations formula named for Charles G. Dawes, chairman of the international committee of experts appointed by the War Reparations Commission to investigate the budget of the Reich and the capacity of Germany to pay. The report of the committee was made on April 9, 1924, and the plan went into effect on September 1, 1924 with Owen D. Young acting as Agent until October 1, when Seymour Parker Gilbert assumed the office.

At the peace conference in Paris in 1919, the subject of reparations by Germany and her Allies was revealed as the key to the economic rehabilitation of Europe. International controversy arose over the ability of Germany to pay, and the extent and rapidity of reparations. The Reparations Commission on November 23, 1923, voted the appointment of two committees of experts, one to investigate the Reich budget and currency stabilization, and one to investigate German exportation of capital to avoid payments. The first committee consisted of nineteen members, among whom were General Dawes and Owen D. Young from the United States. General Dawes was elected chairman when this committee met in Paris on January 14, 1924.

On April 9, the Dawes Committee reported to the Reparations Commission. Their report sought the recovery of the debt of Germany. They had been given two definite things to do: balance the budget and stabilize the mark. Their report upheld the requirement of the payment of reparations from Germany, and provided a sliding scale whereby 1,000,000,000 gold marks would be paid the first year, and increased steadily each year to the fifth when 2,500,000,000 gold marks would be paid that year and thereafter. The securities of payment were to be taxes, railways and industries, including industrial debentures. An index of prosperity was established, based on six sets of representative statistics, from railway traffic, population, foreign trade, consumption of certain commodities such as tobacco, budget expenditure, and the consumption of coal. This index served as a basis to determine the ability of Germany to pay. The Dawes Plan authorized the obtaining of a foreign loan of 800,000,000 gold marks for the gold reserve and the payment of immediate obligations. A new bank, or the reorganized Reichsbank, was to be created to promote the stabilization of German currency. An international organization of control was established, with an agent in charge of payments; three commissioners of railways, the bank, and revenues; and a trustee for railway and industrial bonds. France and Belgium were to relinquish economic control of the occupied territories.

Chiefly because of the question of occupation of the Ruhr, there was grave difficulty in the adoption of the Dawes Plan. An Allied Conference was held in London on July 16, 1924, with Ramsay MacDonald as President. On August 2, Germany was invited to attend, and sent a delegation under Chancellor Marx, which arrived on August 5. On August 10 the

Reparations Commission and Germany signed an agreement to put the Dawes Plan in operation, and a later protocol of further agreements was added, which provided three arbiters, with an American presiding, to settle disagreements; Germany promised to facilitate deliveries as provided under the Treaty of Versailles or the Dawes Plan. The Allies were to aid in rapid restoration of the economic unity of the Reich, and the French were to evacuate the Ruhr within a year. Germany thereupon agreed to enforce the Dawes Plan, the execution of the agreements of which the Reparations Commission pledged to aid, especcially the international loan. On August 19 the Reichstag passed laws for carrying out the Dawes Plan, and on August 30 the conference agreement was formally signed in London.

The great service of the Dawes Plan was in making the actual transfer of the reparations payments dependent on the stability of German exchange. This made possible a means of determining German ability to pay, which was automatic and independent of politics. This withdrew the problem from international controversy and paved the way for later decisions, such as the Locarno agreements. The achievement of the Plan was truly great. It was definitely an emergency measure, but it served to revive confidence as it gave a tentative solution, under which temporary conditions the emotional and economic upheavals of the war might be allowed to subside and the problem be permanently solved.

The agreements of the Dawes Plan were carried out fully on both sides. Yet it did not determine the total amount of German reparations, nor the duration of annuity payments. It was in operation for five years, at the end of which time, on September 1, 1929, the Young Plan became effective. This Plan did not supersede the Dawes Plan, but rather continued and completed it. It fixed the total of German reparations, the duration and amount of yearly payments, and provided for the withdrawal of all Allied troops in Germany, by June 30, 1930.

See Dawes, Charles Gates; Reparations.

Dawson (*dô'sŭn*), an important port and the principal city in the Klondike region and capital of the Yukon Territory of Canada. It is situated on the right bank of the Yukon River where it is joined by the Klondike, about 360 miles northwest of Skagway. It sprang into existence in September of 1896 at the time of the gold rush in the Klondike. The rich deposits of gold in the vicinity have given it world-wide fame. The gold is found in the beds of rivers and creeks.

The principal industries of Dawson are sheet-metal manufacturing, gold mining, coal mining, and garden truck farming. A quartz mill is situated here. The city is reached by steamer to Skagway at the head of Lynn Canal, a deep inlet into the coast of Alaska. Dawson is connected by telegraph with Skagway and by railway with Bonanza, twelve miles distant. Since 1904 the city government has been under Territory administration. In 1931 the population was 891.

Dawson, Coningsby William, an Anglo-American author, was born in 1883, the son of William James Dawson, an English minister and author who came to America as pastor of the First Presbyterian Church in Newark, New Jersey. Coningsby Dawson joined the Canadian army in 1916, and served throughout the war. He was wounded, and subsequently made two lecture tours of the United States. The British Ministry of Information appointed him in 1918 to investigate American military preparedness in France. After the close of the World War, in 1919 he went to England to study problems of European reconstruction. At the request of Herbert Hoover, he prepared a series of reports on the devastated regions of central and eastern Europe. He has written many short stories, and with his father, W. J. Dawson, edited *Best Short Stories* in 1923, which is popular in academic study. Among his more important works are *Slaves of Freedom* (1916); *Carry On* (1917); *The Glory of the Trenches* (1918); *Living Bayonets* (1919); *It Might Have Happened to You* (1921); and *The Coast of Folly* (1924).

Dawson, Sir John William, a noted Canadian geologist and naturalist, was born at Pictou, Nova Scotia, in 1820. He was educated at the University of Edinburgh and made careful researches into the natural history and geology of Nova Scotia and New Brunswick. In 1841, with Sir Charles Lyell, he explored Nova Scotia. His scientific papers and books, especially his *Acadian Geology*, made him well-known. His *Devonian and Carboniferous Flora of Eastern North America* told of the discovery of what is believed to be the lowest form of animal life, the *Eozoön Canadense*, as it is called.

In 1850 he became Superintendent of Education in Nova Scotia. In 1855 he was named professor of natural history at McGill University, Montreal, later becoming principal and chancellor of that institution. In 1882 he became President of the American Association for the Advancement of Science. He was knighted in 1884. In 1886 he became president of the British Association for the Advancement of Science and in 1893 of the Geological Society of America. He was a member of many learned societies. He died at Montreal on November 19, 1899.

Day, Benjamin, an American illustrator and inventor, was born in 1838. He studied art in Paris, and returned to America to take up his chosen career. He began illustrating for books, magazines, and theatrical posters. Discovering a great need of that time, he invented a process in photo-engraving by means of which a shading film permits evenly shaded areas in an illustration. From this original process, all methods of procuring shading have come to be called "Ben Day" or "Benday" work.

Dayton, "home of aviation," a city and seat of Montgomery County, Ohio, is situated on

Miami River, at the mouth of Mad River. The Miami Canal, joining Lake Erie to the Ohio, runs through it, and the city is served by eight railroads. By population it is the fifth in rank of the cities of the state. The streets are broad, some of them 133 feet wide the houses handsome, and its large courthouse is patterned after the Parthenon. Here is a national soldiers' home. The city has large water-power. It has manufactures of railroad-cars, cash-registers, cotton, woolen and iron-goods, oil, flour, paper and machinery and large limestone-quarries. It has many fine churches and other public buildings, and possesses good schools, a preparatory academy and high school and St. Mary's (Catholic) Institute for boys. Population, 175,000

Dead-Letter Office, in the United States postal department, is the place where unclaimed letters are sent. After remaining a month in the office to which they are directed, the unclaimed or "dead" letters are sent to Washington, and opened in the dead-letter office. If the writer's address can be found, the letter is returned to him; if not, it is destroyed. In one year nearly 7,000,000 pieces of mail were received. Many had no state on the address, 3,000 had no address at all; $92,000 in cash and more than $3,000,000 in drafts were found in the letters. Thousands of magazines, illustrated papers, picture-cards and valentines were sent to hospitals.

Dead Sea, the name of a most remarkable lake in the southeast of Palestine, called in the Old Testament, the Salt Sea, Sea of the Plain or East Sea. It is 46 miles long, with a breadth of from 5 to 9 miles. Its surface, which is lower than that of any water known, is 1,292 feet below the level of the Mediterranean. The shape is that of a lengthened oval, with a promontory jutting into it on the southeast. The Dead Sea is fed by the Jordan on the north and by many other streams; but it seemingly has no outlet. The excess of water is held to be carried off by becoming vapor. The tall limestone-cliffs on the east and west, the muddy flat on the north and the low marsh on the south are all barren and dreary. On the north blackened trunks and branches of trees can be seen, incrusted with salt; while on the south is the remarkable ridge of rock-salt, seven miles long and 300 feet high, called the Ridge of Sodom. The proximity of lava-beds, pumice-stone, warm springs, sulphur and volcanic slag proves volcanic work at some time in the past. The long-held belief that the vapor given off by the lake was deathly is not founded on fact. Birds fly over and swim about on its surface. But the salt of the water is inimical to life, though some lower forms of sea-animals are found in it. The water of the Dead Sea has eight times as much salt as that of the ocean. In all lakes or ponds without an outflow the water becomes salty, its feeders all the time bringing in salt while none goes off in vapor, as the water does. The evaporation is great because of the great heat. Rain hardly ever falls; the water is nearly as blue as the Mediterranean; and, though its taste is extremely salty and disagreeable, a bath in it is refreshing. It is almost impossible for the bather to sink in it, however hard he may try. It was for a long time thought that the Dead Sea flowed over the former site of the cities of the plain (*Gen.* xix).

Deadwood, So. Dak., a city, the seat of Lawrence County, in the western part of the state and the center of the gold-mining region of the Black Hills. It is on the Burlington and Missouri River and the Fremont, Elkhorn and Missouri Valley railroads, 175 miles west of Pierre. Its industries, besides boiler-works, embrace machine-shops, lumber-mills, brick and lime-works and smelting-plants for the reduction of gold and other metals. Population, 3,653.

Deaf-Mutes, Education of. The principle on which the deaf are taught was discovered by Jerome Cardan, who was born in 1501. He said that, while writing is associated with speech and speech with thought, written characters and thoughts can be joined together without the go-between of sound and that the teaching of the deaf and dumb, though difficult, is possible. This is very familiar now. With us it is common for a man to teach himself to read a language, though he cannot pronounce it. Many men read French who do not and cannot speak it. Yet this idea of Cardan's was new to the world in the 16th century. The mental condition of the deaf-and-dumb is so entirely unlike that of any other of the ailing members of the human family that it is hard to be understood. The blind can be talked with and read to, and are thus placed in direct touch with the world around them. The deaf know almost nothing, because they hear nothing. Speech tells them nothing, because they cannot hear; books teach them nothing, because they cannot read. The system of teaching by signs and the manual alphabet —in which the letters are formed by different positions of the hands and fingers—is not now used so much as the oral system. The sign-language, until people go out of their way to learn the language of one, keeps the deaf shut out from the world and shut up to each other. By the oral system, the child is taught to speak by seeing how his teacher speaks—to lip-read; that is, to read the speech of his teacher and others, as expressed on their lips. He learns to speak with all, not merely with the deaf; and books, literature and, through these facilities, the world are thrown open to him. Good work for the deaf-and-dumb has been done in the United States. The institutions are well-supported by grants from the states, and are usually well-managed. There also are missions and churches, in which the services are carried on in the sign-language, both in this country and in England.

Deák (*dă'ăk'*), **Francis**, was born in 1803 at Kehida, Hungary. He became minister of justice in the national cabinet but resigned when Kossuth came into power. To Deák, more than to any other man, was due the former dual government of the Austro-Hungarian empire, under which the Hungarians are practically equal to their old Austrian rulers. Deák died Jan. 29, 1876.

Dear'born, Fort, on Lake Michigan, at the mouth of the Chicago River, on the site of the city of Chicago, was built by the government in 1803 to overawe the neighboring Indians. When war was declared against the British, General Hull, then in command at Detroit, ordered the garrison of Fort Dearborn to abandon that post and proceed to Detroit. The departure was delayed, however, and when the retreat began, Aug. 15, 1812, the garrison of 75 men, including officers and 30 friendly Miami braves, with women and children (the families of the soldiers and settlers), was attacked by 500 Pottawatomies. The battle was a short one. At the first fire the Miamis ran, and the troops were soon cut to pieces. During the fight a young Indian savage crept unseen into a wagon, and tomahawked 12 of the children. When two thirds had been killed, the remainder surrendered. Captain Wells, the commander of the 30 Miamis, fought so bravely that, when at last overpowered and killed, the savages took out his heart and ate it, hoping by this means to become possessed of the courage and prowess of the heroic scout. Fort Dearborn was rebuilt in 1816, and was garrisoned most of the time till 1837. In 1857 it was torn down, all but one building, which stood until the great fire in 1871.

Dear'born, Henry, an American general, was born at Hampton, N. H., Feb. 23, 1751. He became a physician, and during his leisure studied military tactics. The day after the battle of Lexington, he marched with 60 men to the aid of the Americans and covered their retreat at Bunker Hill. He went with Arnold to Canada, and was taken prisoner at Quebec. He served as major under Gates at the capture of Burgoyne, and made a gallant charge with his regiment at the battle of Monmouth. He was twice a member of Congress, and for eight years was secretary of war under Jefferson. In 1812 he was appointed senior major-general in the United States army and commander of the northern department. In 1813 he captured York (Toronto) in Canada and Fort George at the mouth of Niagara River. Dearborn was also for two years minister to Portugal. He died at Roxbury, Mass., June 6, 1829.

Death Valley, a desert-valley in Inyo County, California, lying nearly northwest and southeast between the Paramint and Funeral Mountains. The name comes from the fact that a party of emigrants perished here in 1849. It is about 150 miles long and 35 wide. Its surface is about 250 feet below sea-level and is covered for the most part with a deposit of a white salt, mainly borax, that has been washed here from the surrounding mountains. The Amargosa River, usually a dry channel but now and then a raging torrent, drains into it a large desert tract of Nevada. The temperature remains for months near 120° F., and, as the air is almost perfectly dry, all moisture evaporates rapidly. There is little vegetation except a few scrubby species of cactus and greasewood, and little animal life except crows, jack-rabbits, buzzards, horned-toads, rattlesnakes, mice and rats. The surrounding mountains are rich in ores.

Deborah (*dĕb'o-rä*), the mother in Israel, a Hebrew prophetess, judged Israel under a palm-tree on Mount Ephraim. Through her patriotism the Hebrews were delivered from the yoke of the Canaanites, under which they had lain for 20 years. She joined several of the tribes of northern Israel under Barak (meaning lightning), who completely destroyed a great army of Canaanites at Taanach, in the plain of Esdraelon, on the brook Kishon. Sisera, the Canaanite leader, fled, and was murdered in his sleep by Jael. Then "the land had rest for 40 years." The song of Deborah (*Judges* v.) is one of joy over the deliverance of the nation. It is one of the finest gems of poetry in the Old Testament, and is held to be the oldest piece of writing in the Bible.

Debs, Eugene V., was born in Terre Haute, Ind., in 1855. His parents had come from Alsatia, France, and kept a grocery store. At 15 Eugene worked in a railroad shop, and later became a fireman. In 1880 he became grand secretary and treasurer of the Brotherhood of Locomotive Firemen, and editor of their magazine. In 1894 he gave up a salary of $4000 a year to accept $900 as president of the new American Railway Union. For his part in the Pullman strike Debs was imprisoned for six months. At that time he became a Socialist, and soon head of the Socialist party. Five times he was nominated for the Presidency of the United States, and twice polled over a million votes—once, in 1920, when he was in the federal prison at Atlanta, Ga., for making pacifist speeches. President Harding later pardoned him. Deb's warm personality and honesty won him a large personal following. He died in 1926, having done much to further the cause of Socialism.

Decalogue (*dĕk'ă-lŏg*), meaning ten words, the ten commandments, which are placed before the collection of laws called the Book of the Covenant (*Ex.* xx, 22; xxiii. 33). They are also found in *Deut.* v. 1–21. These commandments were summed up in two by Christ.

Decapolis (*de-kap'ō-lis*), meaning ten cities, a district of eastern Palestine, containing the cities Damascus, Philadelphia, Raphana, Scythopolis, Gadara, Hippos, Dion, Pella, Galasa and Canatha. The cities were probably rebuilt and given certain privileges after the conquest of Syria by the Romans in 64 B. C., and at some time bound together in a confederation. The word is not used for the district after the first century.

Decatur, Ill., Mason County, a flourishing industrial city and agricultural market in central Illinois, has five railroads running into it. It lies on the Sangamon River and is 40 miles east of Springfield. It is a thoroughly modern city with electric railways, extensive water system and other civic conveniences. It has railroad shops, corn products mills, and factories making plumbing and lighting fixtures, soda fountains, coffins and burial clothes, paper bags, elevator and agricultural machinery, domestic water systems, fly killers, wire mats, and has three coal mines. James Millikin University with 1,100 students and a Catholic University for girls are located there. Population, 43,000.

Decatur, Stephen, was born at Sinnepuxent, Maryland, Jan. 5, 1779. At 19 he went to sea as a midshipman, saw some service against the French, and the next year became a lieutenant. He gained great distinction in the war with Tripoli (1801–05). His brilliant achievement of boarding and burning the captured *Philadelphia* in the harbor of Tripoli and then escaping under the fire of 141 guns, was said by Nelson to be "the most daring act of the age." For this he was made captain in 1804. In the War of 1812 he captured the British frigate *Macedonian*, but afterward was surrounded by four British frigates and forced to surrender, after the loss of a fourth of his crew. In 1815 he punished the Algerians for their piracy and forced the dey to respect the American flag. Died 1820.

Dec′can, The, is the tableland which lies between the eastern and the western Ghats (Ghauts) in southern India. The name is at times applied to the whole of the peninsular portion of India; but more properly only to that part which lies between the Rivers Nerbudda and Krishna. The region is of historical interest. Here were fought many of the wars which secured the position of the British in India.

December (from Latin *decem*, ten), and so applied to the month called December (the 12th in our year), which was the tenth month of the year in the Roman calendar (the year with the Romans beginning in March). The Anglo-Saxons called it Yule month and midwinter month. In December the sun enters the tropic of Capricorn and passes the winter solstice.

Decemvirs (*dē-sĕm′-vẽrz*), the ten men appointed to codify—that is, to arrange and make into a system—the Roman law, both public and private. Commissioners were first sent to Greece to study the Greek laws, and on their return (302 B. C.) ten patricians, with Appius Claudius at their head, were appointed to write out the laws. By the end of the next year the code was finished and set up in the Forum on ten tables of wood. The next year two more tables were added, from which the code was known as the laws of the Twelve Tables.

Decid′uous Habit. The habit of shedding leaves at the approach of winter or of a regular period of drouth. In our region nearly all the trees and shrubs have the deciduous habit, and are bare during the winter. These plants do not attempt to protect their leaves throughout the winter, as do the evergreens, but drop them and put out a fresh and larger crop at the beginning of the next season. The leaves do not fall off by ordinary decay or accident. They literally grow off, and little furrows appear near the insertion of the petiole, which gradually deepen until the leaves hang on only by a slender woody fiber, which is sooner or later snapped by the wind.

Dec′lara′tion of Independence. Not till after the battle of Bunker Hill and the appointment of Washington as commander-in-chief of all the colonial forces, was the separation of the colonies from Great Britain generally and seriously considered, though North Carolina in May, 1775, had at the famous Mecklenburg convention cut itself off from all allegiance to the mother-country. In May of 1776 Washington wrote from the head of the army, then at New York: "A reconciliation with Great Britain is impossible. When I took command of the army, I abhorred the idea of independence; but I am now fully satisfied that nothing else will save us." Before this, Massachusetts, followed by South Carolina, Georgia and North Carolina, had instructed its delegates in the Continental Congress to vote for independence. In May, Virginia, followed by New Hampshire, New Jersey and Maryland, sent similar instructions to its delegates. On June 7 Richard Henry Lee, a delegate from Virginia, moved a resolution in Congress that "these united colonies are, and of right ought to be, free and independent states and that a plan of confederation be prepared and transmitted to the respective colonies for their consideration and approbation." This resolution was adopted on June 11. Two committees were appointed under it, one to prepare a declaration of independence and the other to prepare articles of union or confederation. The committee to prepare the Declaration of Independence consisted of Thomas Jefferson, John Adams, Benjamin Franklin, Roger Sherman and Robert R. Livingston. They reported on June 28, but a delay was caused by the delegates from New York and Pennsylvania not having received their instructions. It was passed on July 4, 1776, by the votes of all the colonies, each colony having one vote. The sessions of the Continental Congress were held and the Declaration signed in the old Pennsylvania statehouse, known afterward as Independence Hall in Philadelphia. Here still hangs the cracked and broken Liberty Bell which, after the first reading of the Declaration, was rung for over two hours, with the firing of cannon and the beating of drums. Twenty-three years before, this bell had been cast with the prophetic words inscribed on it: "Proclaim liberty throughout all the land, unto all the inhabitants thereof."

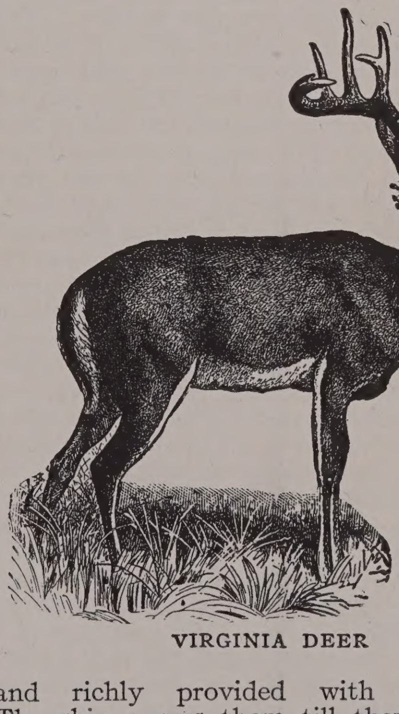
> The Declaration of Independence as adopted is in part as follows:
>
> THE UNANIMOUS DECLARATION OF THE THIRTEEN UNITED STATES OF AMERICA
>
> When, in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume, among the Powers of the earth, the separate and equal station to which the laws of nature and nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.
>
> We hold these truths to be self-evident: that all men are created equal, that they are endowed by their Creator with certain inalienable rights; that among these are life, liberty, and the pursuit of happiness. That to secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed; that whenever any form of government becomes destructive of these ends, it is the right of the people to alter or to abolish it, and to institute a new government, laying its foundation on such principles, and organizing its powers in such form, as to them shall seem most likely to effect their safety and happiness. Prudence, indeed, will dictate that governments long established should not be changed for light and transient causes; and accordingly all experience hath shown that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same object, evinces a design to reduce them under absolute despotism, it is their right, it is their duty, to throw off such government, and to provide new guards for their future security.—Such has been the patient sufferance of these colonies; and such is now the necessity which constrains them to alter their former systems of government. The history of the present king of Great Britain is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute tyranny over these States. To prove this, let facts be submitted to a candid world . . . .
>
> We, therefore, the Representatives of the United States of America, in general Congress assembled, appealing to the Supreme Judge of the world for the rectitude of our intentions, do, in the name, and by authority of the good people of these colonies, solemnly publish and declare, That these United Colonies are, and of right ought to be, free and independent States; that they are absolved from all allegiance to the British crown, and that all political connection between them and the State of Great Britain is, and ought to be, totally dissolved; and that, as free and independent States, they have full power to levy war, conclude peace, contract alliances, establish commerce, and to do all other acts and things which independent States may of right do. And for the support of this declaration, with a firm reliance on the protection of Divine Providence, we mutually pledge to each other our lives, our fortunes, and our sacred honor.

Dec'ora'tion Day, called in the eastern part of the country Memorial Day, is the day set apart for commemorating the services of the soldiers and sailors who lost their lives in the Civil War. Speeches and processions are made in their honor, and their graves visited and decorated with flowers. It is observed by north and south alike; and in most of the states on the same day — May 30.

Its services have been extended to honor the dead who fought in the Civil, Spanish-American, and World wars.

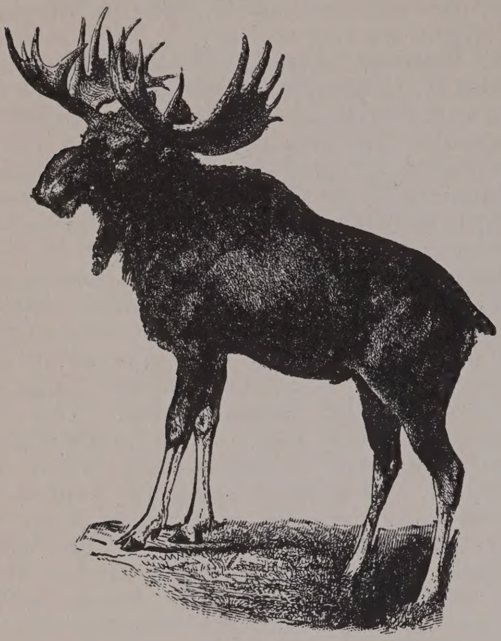
De Cosmos, Amor, whose real name is Dennis E. Lennox, was born in Nova Scotia, went to Australia, and in 1859 came to British Columbia. He was the first citizen of the province to advocate responsible government and union with the Dominion. From December, 1872, to February, 1874, he was premier of the province.

Deer, a general name for a considerable variety of cud-chewing and hoofed animals, including the stag, elk, Virginia deer, wapiti and reindeer. Members of the group are found in all countries except Australia, Madagascar and South Africa. The deer have solid horns which serve to distinguish them from the hollow-horned oxen and antelopes. As a usual thing the antlers are carried only by the males, and they are shed and renewed annually. The female reindeer has antlers as well as the male, and, occasionally, in other forms antlers appear as rudiments in some individual females. When the antlers are renewed, they start as outgrowths from the frontal bone and are covered with soft hairy skin and richly provided with blood-vessels. The skin covers them till they attain their full size, and while it is present they are said to be "in the velvet." They grow with great rapidity, the large antlers of a stag being completely produced in ten weeks. As soon as they are full-grown, a ring is formed at the base which pinches off the blood-vessels, and the outer covering skin begins to shrivel and come off in strips, and it is still further worn off by

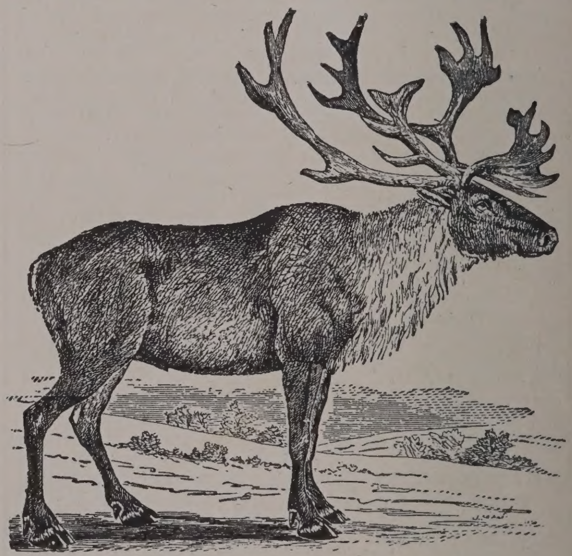


VIRGINIA DEER

rubbing the antlers against trees. The red deer of Europe, commonly called the stag after it has reached an age of five years, is the most abundant form. As its name implies, its coat is of a reddish hue, becoming more grayish in the winter. The young are spotted. This animal is about four feet high at the shoulders and seven feet long. In the buck the antlers project upward and outward, and a full-grown buck presents a fine appearance. Their senses of sight, smell and hearing are very acute, and they are timid and very fleet. In America the so-called Virginia deer and the wapiti are the most representative The Virginia deer is chestnut-red above and white underneath. It is lighter colored in winter. Deer attain a weight of 250 pounds. In autumn and winter they feed on buds, ferns, shoots and bark; in summer, on general herbage and pond-lilies. They come to drink about sunset. The Virginia deer is abundant in various wooded parts of the United States and Canada. It is most abundant in Maine, Vermont, northern Minnesota, Michigan and Wisconsin. It is called, also, white-tailed deer, from the snow-white of the under part of its long, bushy tail, which is held stiffly aloft, when the animal is frightened and running away, and is conspicuous for a long distance. Hunters sometimes call it the flag-tailed deer. The wapiti is often called the American elk, but the name elk belongs, properly, only to the moose. It is larger than the stag of Europe, being, when full-grown, eight feet long and about five feet high at the shoulders. At one time the wapiti was to be found everywhere in the United States, but is now uncommon except about the western tributaries of the Mississippi and in California and Oregon. In the latter places it is abundant. The antlers of the full-grown wapiti are four or five feet long, and three or four feet apart at the points. The moose or elk is the largest of the deer family, with broad muzzle, large nostrils, very long legs and broad flat antlers. The moose are wary and clever and among the most difficult game to approach. They are found from northern Maine to the Arctic regions and both in Europe and America. The extinct Irish elk was an allied species. Remains of the same are now found in peat-bogs of Ireland. When living, this great elk reared its antlers ten feet high, and they sometimes measured twelve feet from tip to tip. The reindeer is at home in Lapland, Finland, eastern Greenland and other northern countries. In Kamchatka reindeer are used as saddle-animals as well as for drawing sledges. The North American variety is commonly called the caribou. The caribou exists in large numbers in Nova Scotia, New Brunswick and Labrador, as far north as Hudson Bay. The United States government is now trying to preserve the reindeer of Alaska, and has so far met with great success. Among other forms in the United States is the long-eared mule-deer, with antlers branching in twos and ears eight inches long. They live on elevated plateaus in Washington, Oregon and Idaho. See Caton: *The Antelope and Deer of America* (2d ed 1881) and Hornaday: *American Natural History*. See, also, ELK, REINDEER and STAG.



MOOSE



CARIBOU

Deerfield, Mass., a town of 2,209 inhabitants (1910), situated in Franklin County. It is at the junction of the Connecticut and Deerfield Rivers and about 33 miles from Springfield. The surrounding region is agricultural. In the town there is some manufacturing, mainly of pocket-books.

There are a public library and a good high-school. South Deerfield, a village in the township, has some importance in history as the scene in colonial times of several conflicts with the Indians. Here, in 1675, occurred the Bloody Brook Massacre which is commemorated by a marble monument. In 1703 De Rouville with his French and Indians burned the place. In Old Deerfield there is a fine monument to the soldiers.

Defiance, Ohio, a city, the county seat of Defiance County, 50 miles southwest of Toledo. It is situated at the forks of the Maumee and Auglaize Rivers, on the Miami & Erie Canal and on the Wabash and Baltimore & Ohio railways. It is in a good farming and stock-raising region, and, besides flour-mills, has many important manufactures, machine-shops, wagon-works, steel barrels and cases and auto parts. It is the seat of Defiance College, and has a public library. Population, 10,000

Defin'itive Nucleus (in plants), a peculiar cell of the embryo-sac of angiosperms, which gives rise to the endosperm. See EMBRYO-SAC.

Defoe (*dē fō'*), **Daniel,** famous as the author of *Robinson Crusoe*, was born at London, most likely in 1661, and was the son of a butcher. He at first intended to become a minister, but instead engaged in business. Little is known of his early life; but it seems he was with Monmouth's army and also in King William's army in 1688; later on, he traveled in France and Spain and became bankrupt; but afterward he paid all or most of his debts. Toward the close of William III's reign, he became noted as an able and busy writer of pamphlets in favor of the king's policy. His poem, *The True-born Englishman*, was written to apologize for the king's being a Dutchman, by showing that the English themselves were descended from various races. Defoe was a dissenter, and as such wrote his pamphlet, *The Shortest Way with Dissenters*. The house of commons ordered the book to be burned. Defoe was tried and sentenced to pay a fine, to stand thrice in the pillory and to be imprisoned during the queen's pleasure. He stood in the pillory on the last three days of July, 1703, in the midst of a mob of friends who protected him from insult and even drank his health. While in prison, he kept on writing, and founded his *Review*, at first a weekly. In August, 1704, he was let out of prison, through the efforts of Harley, whose fortunes he followed from that time on, serving him well as a writer of political pamphlets. In 1719 he issued the first volume of *Robinson Crusoe*, which at once leaped into that popularity which it will never cease to keep. Others of his books are *Captain Singleton*, a work of much brilliancy; *Memoirs of a Cavalier*, perhaps the most real and truthful of all historical romances, which the great Chatham accepted as genuine history; *The Fortunes of Moll Flanders;* and *A History of the Plague*. Defoe died on April 26, 1731. See *Lives*, by Minto, Chadwick and Lee.

Dehis'cence (in plants), the opening of a spore-vessel or seed-vessel to discharge spores or seeds. Almost all sporangia dehisce in some way to discharge their spores, and very many fruits dehisce to discharge their seeds.

De Kalb, John, Baron, was born in Alsace on June 29, 1721. He entered the French army, and rose to be brigadier-general. In 1768 he was sent to America on a secret mission by his government. With Lafayette he joined the American army under Washington, in 1777, with the rank of major-general. In 1780 he was sent to re-inforce General Lincoln, who was then besieged at Charleston, but failed to reach him in time. At the battle of Camden he was second in command to General Gates, and was at the head of the Maryland and Delaware troops. He held his ground till Cornwallis sent against him his whole force. During the last charge he fell pierced with 11 wounds. He died three days later, Aug. 19, 1780.

De Koven, Henry L. Reginald, American musical composer, was born at Middletown, N. H., April 3, 1859, and studied at Stuttgart and Florence. Returning to America, he for a time was a musical critic on New York periodicals, but soon began a career as composer of songs and operas. His chief compositions are *Robin Hood, Don Quixote, The Mandarin, The Highwayman, The Three Dragoons.* Died 1920.

Delacroix (*de-lȧ'krwä'*), **Eugene,** a French painter, chief of the romantic school, was born at Charenton-Saint-Maurice, near Paris, April 26, 1799. In 1822 he exhibited his first work, *Dante and Vergil*. Other paintings are *The Massacre of Scio* and *Blind Milton Dictating Paradise Lost*. He died at Paris on Aug. 13, 1863.

Delagoa Bay (*dĕl'ȧ-gō'ȧ bā*), a now important inlet on the southeast coast of Africa, in the Portuguese province of Lorenzo Marques. It is available for vessels of large tonnage. The Olifant or Limpopo River flows into it, north of the town of Lorenzo Marques. A railway runs inland for 57 miles through the colony, and is continued through the Transvaal, 290 miles distant, to Pretoria. The Beira railway has a length of 204 miles in the colony, and is continued from the British frontier to Bulawayo. The coast region is swampy and malarial. There is telegraphic communication with the Transvaal system. It is stated that Britain, in view of the situation of affairs in South Africa, desires to purchase the Portuguese possessions in East Africa. Britain, it is understood, holding the right of pre-emption at least over Delagoa Bay and its fore-shore, which have become valuable since the acquisition of the Boer republics.

Deland′, Margaret, American novelist was born at Alleghany, Pa., Feb. 23, 1857, and was educated at Pelham Priory, New Rochelle, N. Y. In 1880 she married and settled in Boston, Mass. Her first volume was one in verse, entitled *The Old Garden. John Ward, Preacher*, her earliest novel, made a hit by its vigor and keenness in tracing the influence of certain doctrinal beliefs current in church-circles and supposed to be a part of Christianity. This was followed, among others, by *The Story of a Child; Philip and his Wife, The Common Way; Old Chester Tales;*

Delaroche (*de-lä′rôsh′*), **Hippolyte,** known as Paul, a French painter, was born at Paris, July 16, 1797. He first came into notice in 1824 by his pictures, *St. Vincent de Paul Preaching in the Presence of Louis XIII* and *Joan of Arc before Cardinal Beaufort*. Among his other paintings are *The Princes in the Tower* and *Cromwell Contemplating the Corpse of Charles I*, which is held to be one of the first historical paintings of modern times. Perhaps his greatest work is the series of paintings on the wall of the semicircular saloon of the *École des Beaux Arts* (School of Fine Arts). The painting comprises 74 figures, among them the greatest painters, sculptors and architects in all history. Delaroche died at Paris, Nov. 4, 1856.

Del′aware Bay separates New Jersey and Delaware. Where it flows by Cape May and Cape Henlopen and joins the Atlantic, it is 15 miles broad, It is about 60 miles in length, to the entrance of Delaware River, and its greatest breadth is from 25 to 30 miles. The main channel is from 35 to 75 feet deep, and the largest vessels can sail to Philadelphia. A large breakwater, built by the government at Cape Henlopen, affords a safe harbor.

Delaware, Ohio, a city, the seat of Delaware County, on the Whetstone River and on the Cleveland, Cincinnati, Chicago & St. Louis, the Columbus, Sandusky & Hocking and other railroads, 23 miles north of Columbus. It was incorporated in 1827, and in 1844 became the seat of the Ohio Wesleyan University of the Methodist Episcopal body. It has good churches, schools and a public library, and is noted for its mineral springs, which have remarkable medicinal properties. Its industries, besides railroad repair-shops, embrace foundries and clay-works, manufactures of chairs, carriages, gloves, woolens, flour, lumber and building-material. Population, 9,076.

Del′aware River is formed by the junction, on the boundary line of New York and Pennsylvania. of two small streams which flow from the Catskills. It separates those states till it reaches Kittatinny Mountain, about 70 miles distant, where it turns sharply southwest and separates Pennsylvania from New Jersey. Soon it passes through Delaware Water Gap, a gorge whose banks are rocks 1,000 and 1,200 feet high on either side. Easton and Trenton are passed, and tide-water is met 132 miles from the sea. Philadelphia is the head of navigation for the largest vessels. Just across the mile-wide channel is Camden. Forty miles below Philadelphia the river empties into Delaware Bay, after a course of 300 miles. The chief branches are the Lehigh and the Schuylkill. The river is connected with the Hudson by the Delaware and Hudson and Morris and Essex Canals.

Delaware, State of. This is the smallest state of the Union, except Rhode Island, being 93 miles long and from 9 to 38 broad, and covers 1,960 square miles. It lies between Delaware Bay and Maryland.

Surface. The most elevated ground in the state is behind Wilmington, and it forms the divide between Brandywine and Christiana Creeks. A fine rolling country is found in the extreme north where the Pennsylvania upland enters. A ridge which runs northwest and southeast through the state forms the watershed of Delaware and Chesapeake Bays, but follows the Atlantic coast-line. The rivers are small, but some are navigable.

Fisheries. The well-known Cypress-swamp, 50,000 acres in extent, is filled with game, and its salty inlets abound in the finest fish and oysters.

Climate. Delaware has a range of temperature between the severe extremes of New England and the heat of the south.

Agriculture. Products in the northern section consist of cereals, hay, wheat, corn, oats and sorghum; while the central and southern portion of the state is noted for its dairy-products as well as for its berries, grapes, melons, tomatoes—raised and canned—and especially its peaches. Some 10,000 carloads of peaches are shipped out yearly, besides the quantities sent by water or used in canneries and evaporating works.

Manufactures. The clays and kaolins of Wilmington are made into brick, terra-cotta and crockery. The shipyards, car-shops, powder-mills and bridge-works of Wilmington add largely to the other industries of the state. Chief among these are the manufacture of pumping and mining-apparatus, paper-making machinery and leather-goods, especially morocco.

Education. Delaware has good public schools, furnishes free text-books and maintains separate schools for its colored population and a state agricultural college for them at Dover. There are 14 academies, seminaries and high-schools; Delaware College at Newark (co-educational) has scientific and normal departments.

Government. The governor serves for four years, and has larger power in appointing to office than most governors, but has no veto-power. The state is practically out of debt. The townships are called hundreds, after an English custom older than King Alfred's time. Every county-jail still has its pillory and whipping-post. One sixteenth of the people are foreigners, and one sixth are colored. There are but three counties, and in view of the many marshes Randolph of Roanoke once said that the Delaware senators represented three counties at low tide and one county at high tide. The state is well-served with railroads. The Chesapeake and Delaware Canal, which joins the two bays at their necks, was finished in 1829. The capital is Dover, and the only large city is Wilmington (population, 87,411). The population of the state is 225,000, making it the smallest state in population except Wyoming and Nevada.

History. The first white settlers of Delaware were 32 Hollanders, who were all massacred by the Indians. In 1638 Peter Minuit was sent out by Queen Christina of Sweden, and built Fort Christina on the site of Wilmington, garrisoned with Swedes and Finns. The Dutch afterward won the province from the Swedes, and in turn were ousted by the English. The duke of York, who was proprietor both of Delaware and of New Amsterdam, granted Delaware to William Penn in 1682; but it never was considered a part of Pennsylvania. The colony took an earnest part in the Revolutionary War and suffered for its patriotism, for Lewes was bombarded and Newark and Wilmington captured by the British. Delaware was the first state to ratify the constitution. Though a slave-holding state, it did not secede during the Civil War. Delawareans are called The Blue Hen's Chickens, a nickname given their soldiers in the Revolutionary War, because of the saying of one of their officers that no cock was game unless it came from a blue hen.

Delaware or **De La Warr, Thomas West, Lord,** was appointed captain-general and first governor of Virginia in 1609. He reached the colony in the next year, with three ships. He found the colonists in despair because of scarcity of food and bad government, but by good management he made them orderly, contented and industrious. In 1611 ill-health sent him back to England. In 1618 the bad government under which the Virginians suffered turned their thoughts to Lord Delaware, and they urged him to become their governor. He set out to meet their wishes, but died on the voyage.

Delawares, a tribe of the great Algonquin family of Indians, were found by the whites in detached bands, under chiefs or sachems, dwelling on the Delaware River, and calling themselves Lenapes. The Dutch, the Swedes and the English all traded with them peaceably. William Penn bought large tracts of their lands. The Delawares claimed that they were cheated in this walking-treaty, as it was called, and at first were not going to remove. But the Pennsylvanians called on the Six Nations for help, who haughtily ordered the Delawares, as women, to retire. They at this time were composed of three clans, those of the Turtle, the Turkey and the Wolf. From this time they kept splitting into bands and changing their homes. The Ohio, Muskingum, Miami, parts of Canada, the White River of Missouri, the Red River and the Kansas were successively homes of the Delawares. Most of them now are on the Verdigris River, on lands bought from the Cherokees. The Delawares fought at Braddock's defeat, took part in the wars of Pontiac, helped the Miamis in the defeat of St. Clair in 1791, fought against the Sioux, and in the Civil War sent most of their warriers to join the north. The early Swedish settlers attempted to Christianize them; but the best work among them was done by the Moravians, beginning in 1741. In 1866 the United States government allowed them to become citizens, which they chose to do, their lands and money held by the government being divided among the members of the tribe. Tammany, the name adopted by the well-known political society of New York city, was an early Delaware chief. The Delawares now number about 1,000.

Delcassé (*dĕl-käs-sā*), **Théophile,** former minister of foreign affairs, was born at Pamiers on Nov. 1, 1852, and began his career early. In 1889 he entered the French chamber, and in 1893 became under-secretary for the colonies, and in the following year colonial minister in the Dupuy cabinet. He was a consistent advocate of colonial expansion, and had charge of the Fashoda interests in the Méline cabinet in 1898 as minister of foreign affairs. He retained the latter post in the Waldeck-Rousseau ministry, under the presidency of Émile Loubet. Owing to differences with Germany over Morocco (*q. v.*) which threatened war he retired to private life in 1905.

Del'hi (*dĕl'ē*), the chief city of the Punjab, India, is situated on the Jumna River 954 miles northwest of Calcutta. It is walled on three sides, has ten gates and stands on high ground. The city is joined to southern India by two railroads. Among the buildings stands foremost the famous palace of Shah Jehan, 3,200 feet long by 1,600 feet broad. In the heart of the city stands the great mosque, one of the finest in India. The *Minar*, built in the 13th century, is a pillar 238 feet high, 47 feet through at the bottom and 9 feet at the top. It has a winding staircase, wreathed with inscriptions from Koran. Modern Delhi is noted for its broad streets, the chief of which is Silver Street. It has a large wheat-trade, and its bazars are famous for gold and silver-work, precious stones, shawls and other articles of luxury.

Delhi was the capital of the Afghan and, afterward, of the Mogul empire. It was taken by the British army in 1803, and on the coronation of George V, in Dec., 1911, the capital of India was changed from Calcutta to Delhi. Population, about 200,000, more than half of whom are Hindus.

De Long, George Washington, American explorer, was born at New York, Aug. 22, 1844. After graduating at the United States Naval Academy in 1865, he set out on a voyage to Greenland in 1873. He wished very much to engage in Arctic exploration, and in 1877 his wish was fulfilled. James Gordon Bennett bought and elaborately fitted out the *Jeannette*. It was placed under the authority and protection of the United States Navy, and, with De Long in command, sailed from San Francisco on July 8, 1879, through Bering Strait, in search of the north pole. On June 13, 1881, the *Jeannette* sank, crushed by ice. De Long, with some of the party, perished on the banks of the Lena, in Siberia, in October of that year.

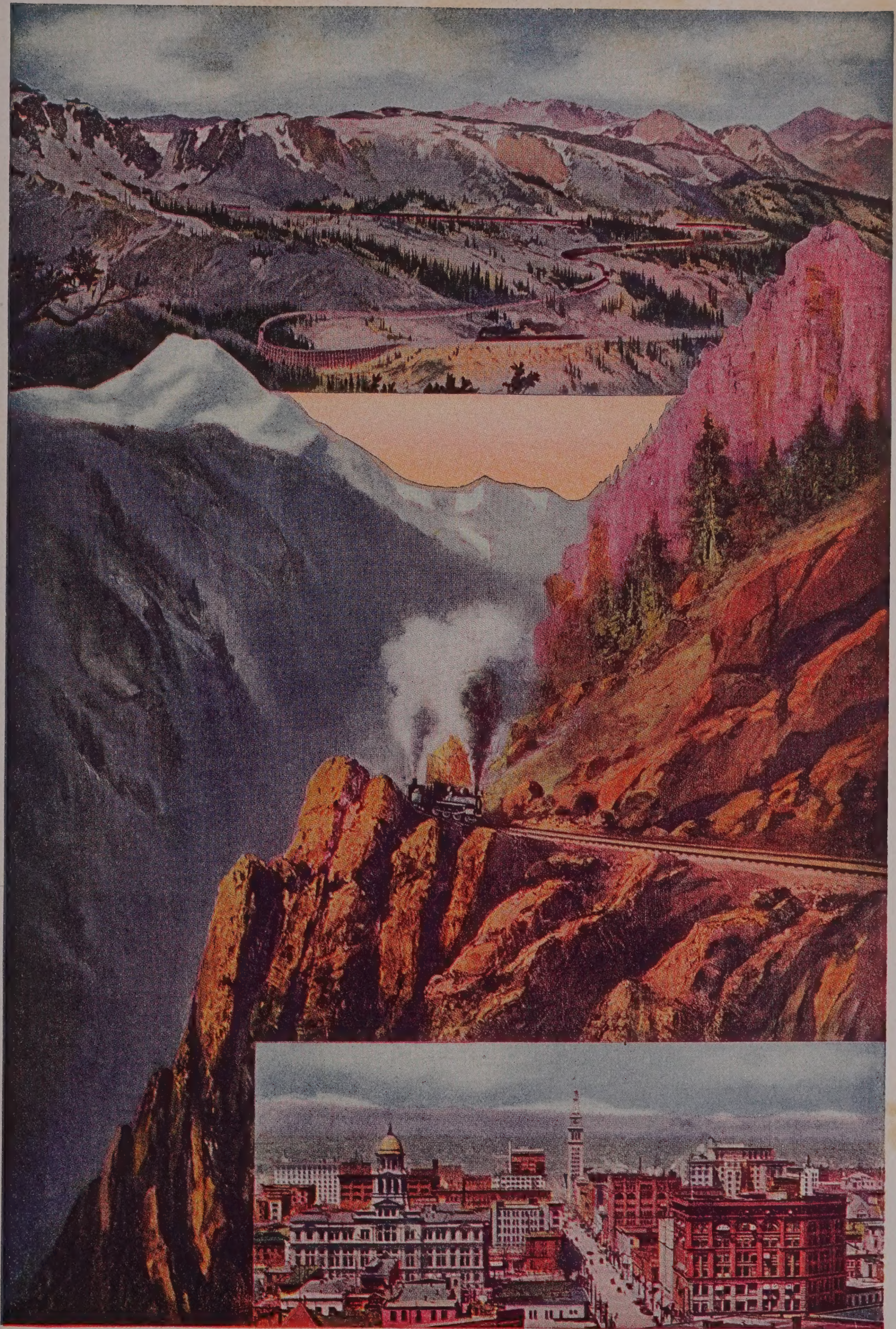
Delos (*dē̆'lŏs*), an island in the Grecian archipelago, is the smallest of the Cyclades, covering little more than one square mile. According to the old Greek story, it first was a floating island, but was fixed to the bottom by Zeus, in order that it might become a safe-resting-place for the goddess Leto in giving birth to Apollo and Artemis. Delos very early had a great festival of Apollo, attended by Greeks from many nations. The Confederacy of Delos, with Athens at its head, which was formed in 477 B. C., was so called because its deputies met at the temple of Apollo in Delos, and it kept its treasure there. After 146 B. C., when Corinth fell, Delos became a center of business. Its traffic was so great that it is said 10,000 slaves changed hands in a single day. It was noted also for its palm-trees, besides its brass and brazen vessels. Delos was laid waste in the Mithradatic war (87 B. C.), and never recovered.

Delphi (*dĕl'fī*), an old Greek town in Phocis, celebrated chiefly for its famous oracle of Apollo. From the Delphian nobles were at first taken the chief magistrates and the priests of the temple, while the Pythia, or priestess who delivered the oracle, at first always a young maiden, but afterwards a woman not younger than 50, was usually chosen from some family of poor country-people. In the center of the temple was a small opening in the ground, out of which arose an intoxicating vapor. The Pythia, having breathed this, sat down upon the tripod or three-legged stool, which was placed over the aperture in the ground, and then delivered the oracle. The oracle was either given at first in verse or else handed over to a poet employed for that purpose. As the Delphic oracle became more and more celebrated, Delphi grew into a town of great wealth, famous not only in Greece but among neighboring nations. Here the Pythian games were held, and it was one of the two places of meeting of the Amphictyonic Council. The fourth temple—the first to be built of stone—was destroyed by fire in 548 B. C., and during the next century the fifth and last was built by the Amphictyons at a cost of 300 talents or $575,000. It was faced with Parian marble and adorned with statues by the greatest living Greek sculptors. In 480 B. C., Xerxes sent a part of his army to plunder the temple; but as they climbed the rugged path that led to the shrine, a peal of thunder broke overhead and two huge crags, tumbling from the heights, crushed many of the Persians to death, while their comrades, struck with terror, turned and fled. It was, however, plundered afterward, and by Nero and by Constantine among others. In the time of Pliny there were 3,000 statues in Delphi, and within the temple for a long time stood a golden statue of Apollo.

Delta (*del'tä*) is a deposit formed at the mouth of a river from soil and other matter carried down in the stream or rolled forward upon the river bed. The name was first given to the tract of land thus formed by the Nile, which is in the shape of a triangle and resembles the Greek letter *delta* (**Δ**). More or less sediment is carried down by all rivers; but the forming of a delta depends upon there being no currents at the mouth of the river to sweep the sediment out to sea.

Deluge (meaning flood). By the deluge is usually meant the flood of Noah, the account of which is given in *Genesis* vi-ix. Stories of a great flood, agreeing more or less with the narrative given in the Bible, are common to most races. The Hindu story represents the god Vishnu as warning the prince Satyavarata of the coming of the flood, and furnishing him with a large vessel in which he and seven others, with their wives, were saved. The Chaldean Noah is called Xisuthrus, who sails in a ship guided by a steersman. The flood is seven days at its height, and Xisuthrus sends out first a raven, then a dove and lastly a swallow.

De Mille (*dê-mĭl'*), **James,** Canadian novelist, was born at St. John, New Brunswick, in 1837, and died at Halifax, Nova



DENVER AND THE MOUNTAINS

Here is beautiful Denver, as Alice saw it "in front of the mountain wall," and the railroad that "loops and runs along the edges of the cliffs."

Scotia, in Jan., 1880, where he held the post of professor of history and rhetoric in Delhousie College. Besides a number of books for boys, he wrote *Helena's Household*, a tale of Rome in the first century; *The Dodge Club*, a story of a party of Americans traveling in Italy; *The Living Link;* and other works.

De Monts, Pierre du Guast, Sieur, was the companion of Champlain in 1604, a Calvinist and patentee under the king of the country of Acadié, which he sailed from France to colonize. They wintered on the island of St. Croix, where they suffered greatly from illness and cold, explored the Atlantic coast as far south as Cape Cod the following summer, and returned to France. De Monts was also patron of the colony on the St. Lawrence in 1608.

Demosthenes (*dē-mŏs'thē-nēz*), the greatest orator of Athens and Greece, was born about 383 B. C. His father died when he was seven years old, leaving him well-off; but his guardians cheated him out of his property. When he came of age, he brought suit against them. Most of the property was lost, but the suit was useful to Demosthenes; it forced him to study law, gave him the doggedness and strength of will that marked him through life, and by making him poor drove him to the pursuit of law as a means of livelihood. At Athens the parties to a suit were made to plead their cause themselves; but they often had their speeches written by a speech-writer. Demosthenes became a speech-writer, and soon had a large practice. By the time he was 30, he was rich enough to devote the remainder of his life to politics. At this time danger threatened Greece from the north—from Macedonia, a country which the Greeks thought half-savage and held of no account in Greek politics, but which, in the lifetime of Demosthenes, destroyed the liberties of Greece. Demosthenes' fame as a statesman rests on the fact that from the outset he foresaw the danger threatened by Philip of Macedon. Had his advice been adopted, Athens and Greece might have been saved. He wanted the rich to allow themselves to be taxed for war-purposes, the poor to agree that less public money should be spent on the great national festivals, and that rich and poor alike should serve in the army, instead of employing hired soldiers. Demosthenes failed to convince his fellow Athenians, and only when it was too late was his policy adopted. When Philip attacked the state of Olynthus, the orator delivered his speeches known as the *Olynthiacs*, which with the orations against Philip, the *Philippics*, are the greatest efforts of Demosthenes. During the next few years (346–340), he was engaged in forming an anti-Macedonian party, but the fatal battle of Chæronea (338), in which Philip completely triumphed, put an end to these efforts. In 330 he made his famous speech *On the Crown*, which was a defense of his whole political career. In 324 the treasurer of Alexander the Great decamped to Athens with a large sum of money. This money was placed in the state-treasury in charge of Demosthenes and others, and when Alexander demanded it, half of it was missing. Demosthenes was accused and condemned, but escaped into exile. He was not guilty of the theft, but was condemned by his political enemies. When Alexander died, Demosthenes was recalled from exile to lead an attempt to throw off the Macedonian yoke. The battle of Crannon put an end to the revolt. Demosthenes fled, and, on being captured, poisoned himself, 322 B. C.

As a boy Demosthenes was nervous, timid and rather girlish, and his mother allowed him to shirk the gymnastic training and out-door-life in which all young Athenians took part. He further was troubled with hesitation in speaking and with shortness of breath, but his will-power overcame all these weaknesses. It is said that he forced himself to speak with a pebble in his mouth; and, to get used to talking amid the noise of the popular assembly, he would speak as he walked up and down the seashore with the waves roaring in his ears as they beat upon the rock. His hard work [and great capacity for taking pains are seen in the high finish of his speeches, as distinguished above those of every orator. The dignity, pathos, might, majesty and power of his speeches rank them with those of any orator that has ever lived.

Dena'rius (Latin *deni*, ten each; from *decem*, ten), the chief Roman silver coin, first minted as early as 269 B. C. and equal in value to ten of the copper coins called *as*. As the latter became reduced in size and value, the *Denarius* in the second century, B. C. equalled about 16 of the copper or bronze coins known as *as;* though finally the silver coin dropped out of use about the third century of our era. In Nero's time the *denarius* had a value, in English money, ranging from 7½d to 9½d or about 17 cents of our decimal currency. It is the coin referred to as a penny in the New Testament.

Denis, Saint, the patron-saint of France, was sent from Rome about 250 A. D. to preach the Gospel to the Gauls. At Paris he made many converts. The Roman governor of this part of Gaul ordered Denis, with two other Christians, to be brought before him. As they kept firm in their faith in spite of threats, they were cruelly tortured and afterward beheaded. It is stated that the bodies of the three martyrs were thrown into the Seine, but were recovered and buried by a Christian woman. In 636 King Dagobert founded on the site of their graves an abbey, called St. Denis, which soon grew to be one of the richest and most important in the whole kingdom, and was long the burial-place of the French kings. For a long time the saint's name was the war-cry of the French soldiers, who charged with the cry: "Montjoye Saint Denys!"

Denison, Tex., a town in Grayson County and near the Red River in north-central Texas, on the Mo.. Kans. & Texas and the Houston & Texas Central railways. It has considerable trade in fruits and agricultural products and a number of manufacturing establishments, including railway machine-shops. St. Xavier convent is situated here, and besides good public schools there also is a business-college. Denison erected the first public-school building in Texas. Population, 20,000.

Den'mark, the smallest of the three Scandinavian kingdoms, consists of the peninsula of Jutland and a group of islands in the Baltic. Besides Denmark proper, under the rule of the Danish king, are now the Faroe Islands, Iceland, Greenland and the Danish West Indies of St. Thomas, St. Croix and St. John. The area of Denmark proper is 15,592 square miles, that of Iceland, Greenland and the West Indies 86,634 square miles, with a total population of 2,775,076. Denmark is separated from Norway on the north by the great, broad arm of the North Sea known as the Skager Rack, from Sweden on the east by the Sound and the Cattegat, and on the south it is bounded by Germany.

Surface and Drainage. The greater part of Denmark proper is low, the highest point being less than 600 feet above the sea. The coast is usually flat, skirted by sand-ridges and shallow lagoons. On the east coast are many bays useful for navigation and valuable for their fisheries, and there are many good harbors. There are no rivers though the canals are important.

Climate. Mists and sea-fogs are frequent, and rain, snow or hail on an average 150 days in a year. In the spring a cold, dry wind, called the *skai*, whirls clouds of fine sand from the coast inland, doing great damage to the crops.

Natural Resources. The commonest tree is the beech, which nowhere flourishes as it does in Denmark, though 300 years ago, the now rare oak was the great Danish tree. Denmark is poor in minerals. Peat from the many bogs, brown coal or lignite and seaweed take the place of wood as fuel. The value of the fisheries in one year exceeded 10 million dollars.

Agriculture. About 80 per cent. of Denmark is good soil, and nearly half the people are farmers. The land for the most part is parceled out into small holdings. The main crops are oats, barley and rye; wheat, flax, hemp, potatoes, butter and bacon are other leading products. Cattle, horses, sheep and goats are raised in sufficient numbers for exportation.

Manufactures. While Danish manufactures are not of great importance, the state in 1910 had 28 distilleries, whose brandy-output was 3,300,699 gallons. Other important manufactures are beer, beet-sugar and oleomargarine.

Education. The people are well-educated. Parents are compelled to send their children to school between the ages of 7 and 14 years. There are over 3,000 elementary schools, with 370,000 pupils, beside 80 high, 31 Latin and 19 agricultural schools. There are a Royal Academy of Arts, having 10 teachers and 300 pupils, and a Polytechnic Institution with a faculty numbering 40 and 600 students. The University of Copenhagen has 95 professors and about 2,000 students, and there are numerous colleges and other advanced schools.

Government and Religion. The established religion, to which the king must belong, is Lutheranism. Denmark is a constitutional monarchy, the king having a cabinet of eight ministers. The king was chosen by the people until 1660, when people and clergy, driven by hatred of the nobles, gave the king absolute power and made the crown hereditary. A constitution was afterward granted to the nation. The present form of government was adopted in 1849. The national legislature or *rigsdag*, consists of the upper house or *landsthing* and the lower house or *folkething*, which is chosen by the people.

Army and Revenue. The army numbers some 14,000; the war-strength is 50,000; and the navy, which is small and chiefly engaged in coast defense, comprises three monitors, three torpedo-gunboats and seven torpedo-boats. The revenue about equals the expenditure—about 100 million kroners annually. (The nominal value of the kroner is 25 cents.) The state in 1911 had about 2,120 English miles of railway, 1,212 miles of which it owned; 7,979 miles of telegraph lines, and 255,141 miles of telephonic wires.

History. Denmark's history goes back to the dim twilight of the saga-period, out of which loom the figures of its heroes, their brave deeds and daring voyages. Here the Celts first had their home, and from these shores the Angles and Saxons set sail in the fifth century to conquer England; while in their place the Danes of Zealand settled on the deserted lands. The missionary Ansgar baptized a Danish king as a Christian in 826, but their being Christians did not hinder the Danes from making their usual inroads into the territory of the Franks or check the piratical voyages of the famous vikings. Gorm the

Old, who first united the islands and the mainland under one rule, opposed Christianity; but Canute, his grandson, the conqueror of England, was its zealous friend. During the reigns following that of Canute, the nobles grew powerful by means of the feudal system and ground down the once free people to serfs. Waldemar I (1157–1182) conquered Norway; while Waldemar II conquered German lands, which were lost under his successors. The great Queen Margaret (1375–1412) ruled Denmark, Norway and Sweden so well that for once the three rival Scandinavian kingdoms lived together quietly and peaceably. Christian I (1448–81), the founder of the Oldenburg line of kings, which maintained itself on the throne until 1863, was chosen king by the people, who in this case used their ancient right of election to the throne. Christian II (1513–23) was such a tyrant that he lost his throne and his freedom; the Danes chose his uncle, Frederick I, to be their king, while Sweden was forever separated from Denmark. Under Christian IV, an able ruler handicapped by the opposition of the nobles, the Danish possessions still held in Sweden were lost, and with them the undivided control of the Sound. By the 18th century the peasants had become free from serfdom and the laws were better carried out. Copenhagen was bombarded in 1801 by the British under Nelson. A second British bombardment took place in 1807, when the Danish fleet was surrendered. From this time till 1813 Denmark was in the hands of Napoleon. Then she was forced to cede Norway to Sweden. In 1864 Prussia and Austria, as the heads of the German confederation, forced Denmark to give up Holstein and Schleswig. As a result of the World War the northern portion of Schleswig was restored. Extensively dismembered as she has been, Denmark has, however, prospered through the steady and combined industries of her thrifty people.

Christian IX, came to the throne in 1863, died Jan. 29, 1906, and was succeeded by his son Frederick VIII on whose death May 14, 1912 his son was crowned Christian X.

Dennison, William, war-governor of Ohio, was born at Cincinnati, O., Nov. 23, 1815; and died at Columbus, June 15, 1882. After graduating at Miami in 1835, he studied law, and in 1848 became a member of the state legislature of Ohio, and in 1860 was chosen governor. He was a stanch supporter of the Union, being an anti-slavery man, and incited the state to raise and equip troops for the prosecution of the war and to provide funds for their maintenance. Under Presidents Lincoln and Johnson he was postmaster-general. Governor Dennison was a philanthropic benefactor of Dennison University (formerly known as Granville College).

Den′sity is defined as the ratio of mass to volume. This term is so frequently misused by writers on scientific subjects, that it was considered worth while by the international congress of physicists, at Paris in 1900, to pass a resolution defining this quantity as stated above. Density and specific gravity are by no means the same, although one is proportional to the other. The specific gravity of any substance is defined as the ratio of its density to the density of water. The average density of a body is the ratio of the total mass of the body to the total volume of the body, while the density of a body at any one point is the limit which is approached by the ratio of a small mass about that point to the volume of this small mass.

Den′ver, the capital of Colorado, is situated north and east of the center of the state, 922 miles west of St. Louis. It is on a level plain, 5,196 feet above the sea, beyond which rise the snow-capped peaks and deep-blue shoulders of the Rocky Mountains. Denver was founded on a barren waste, dry and treeless, in 1858, and the close of the Civil War saw it a rising frontier-town. In 40 years the mining camp has been transformed into the Queen-City of the Plains, with stately buildings of brick and yellow stone and wide, shaded streets, provided with all the appointments of a modern American city; and it has become the meeting-point of a great network of railroad lines, with four direct lines to the east. The city now covers about 75 square miles on both sides of the South Platte River. It is the center of the great mining-interests of the state. It has a United States assaying mint, and three of the largest plants in the world for the smelting of ore are located here, giving employment to 2,000 persons and having an annual output in bullion of about $30,000,000. It also has a large trade in live stock, it being the central point between the breeders on the south and the breeders on the north. It has excellent public-schools, the value of its school-buildings alone being over $5,000,000; it has 209 churches and 230 miles of street railway. The main water-supply for the city is brought from the mountains; underneath the city, within a thousand feet, is abundant water for artesian wells. An uninterrupted area of 200 miles of a snow-capped mountain-range from north to south, a perfect climate and a beautiful city combine to make Denver one of the most attractive places of residence in the country, while the scenic attractions and climatic advantages of Colorado attract many tourists in search of health and pleasure. Population, 275,000.

De Pauw University is located at Greencastle, Ind. This institution was chartered in 1837 as Indiana Asbury University. It was later enlarged and endowed through the graciousness of Washington C. De Pauw. In 1884 the name was changed to De Pauw University. It has a college of liberal arts and a school of music. In 1933 the student body numbered 1,303 and the faculty 97.

Depew, Chauncey Mitchell, an American lawyer and orator, was born in Peekskill, New York, in 1834. He was educated at Yale University, and admitted to the bar in 1858. He served in the New York Assembly from 1861 to 1962, and was secretary of the state of New York from 1864 to 1865. He became interested in railroads through association with the Vanderbilts, and in 1866 began a successful career as corporation lawyer. He was attorney for the New York and Harlem Railroad, beginning in that year, and in 1869 became attorney for the New York Central and Hudson River Railroad, of which he later became president. In 1875 he became general counsel for the entire Vanderbilt system of railroads, in 1898 chairman of the board of directors. Finally he was a director of over forty railroads. Chauncey Depew withdrew his candidacy for the presidency in favor of Benjamin Harrison in 1888. He was elected to the United States Senate from his native state in 1899 and served until 1911. In 1905 he became a director of the Equitable Life Assurance Society, from which he later resigned. His chairmanship of the Vanderbilt railroads he kept until his death, in 1928. Mr. Depew was chiefly renowned as an orator, and an after-dinner speaker.

De Puy, William Harrison, an American clergyman, was born at Penn Yan, New York, in 1821. He was educated at Genesee College, at Union University, and at Mount Union College. He was ordained to the Methodist Episcopal ministry, but did little preaching, devoting himself to editorial work instead. He became associate editor of the New York *Christian Advocate,* and editor of the *Methodist Year-Book.* He published *The People's Cyclopedia of Universal Knowledge* (1879); *American Revisions and Additions to the Encyclopedia Britannica* (1891); and *University of Literature* (1896).

De Quincey (*dē kwĭn'si*), **Thomas,** an English author, was born in Manchester, England, on August 15, 1785. His father, a linen merchant, died when Thomas was seven years old, leaving his family well provided for His mother was of good family and a cultured woman. Young Thomas was educated at Bath and Manchester. Although he was an apt scholar, showing especial genius for Latin and Greek, he was morbidly unhappy at school, so much so that he ran away in 1802 and wandered through the Welsh hills and finally settled in London. There he was discovered by his guardians and he was promptly sent off to Oxford where he remained for five years, but obtained no degree. He had long suffered ill-health and it was while at Oxford that he first resorted to opium to ease his pain. The use of the drug afterward became an overmastering and lifelong habit.

De Quincey soon became acquainted with Coleridge, and visited Wordsworth and Southey at the English Lakes. In 1808 he returned to London where he became an associate of Knight, Lamb, Hazlitt and other men of letters. In 1809 he began the pursuit of a literary career at Grasmere. In 1816 he married Margaret Simpson, "one of nature's gentlewomen." In 1819 he edited the *Westmoreland Gazette,* a weekly paper, and contributed to *Blackwood's Magazine* and the *Quarterly Review.* In 1821 there appeared in the *London Magazine* his *Confessions of an English Opium Eater,* which at once made him famous. With the exception of a work on political economy and a novel, all of his writings appeared in magazines. His essays are on all manner of subjects and are almost faultless in style. One of his best specimens of his impassioned prose, as it has been called, is his paper on *Joan of Arc.*

In 1828 he settled at Lasswade near Edinburgh and lived there until his death. Among the best known of his writings are: *On Knocking at the Gate in Macbeth* (1823); *Murder Considered as One of the Fine Arts* (1827); *Suspiria de Profundis* (1845), and *English Mail Coaches* (1849). He died on December 8, 1859.

Derby (*där'bĭ*), a parliamentary, municipal and county borough, manufacturing town and capital of Derbyshire, England, is situated about 129 miles northwest of London on the Derwent River. Centuries ago a Roman station once occupied this site. In the days of Edward the Confessor it was a royal borough. Since 1295 it has been represented in Parliament by two members. It was granted many charters in its early days and in 1638 it was placed under a mayor.

Derby is interesting for its fine churches, abbey ruins, feudal castles and manor-houses. Among its many fine specimens of architecture are the Tower of All Saints, 175 feet high, and the old chapel of St. Mary-on-the-Bridge. The grammar school of Derby was founded in 1162.

Derby is the headquarters of the London, Midland and Scottish Railway work-shops, offices, and engineering establishments. The principal manufactures of the borough are silk and cotton goods, elastic web, lace, hosiery, iron, lead, shot, porcelain, marble, chemicals, and spar. Silk was first manufactured here in 1719, by John Lombe. The original mill still used by him stands to-day on an island in the Derwent. In 1931 the population of Derby was 142,406.

Dermatogen (*dẽr-măt'ō-jĕn*), the thin external layer of meristematic tissue which covers the growing points of plants and gives rise to the epidermis. At the apex of a growing stem or root there is an embryonic region where the different parts of the plant-body are organized. That embryonic region is called dermatogen, the name literally meaning the epidermis-producer.

George H. Dern
Secretary of War

Dern, George Henry, an American statesman and Secretary of War during the Administration of Franklin D. Roosevelt, was born in Dodge County, Nebraska, on September 8, 1872, the son of John and Elizabeth Dern. He was graduated from the Fremont Normal College in 1888, and attended the University of Nebraska in 1893 and 1894. He married Lottie Brown of Fremont, Nebraska, on June 7, 1899. Five of their seven children are living. George Dern began mining in Utah in 1894. He was treasurer of the Mercur Gold Mining and Milling Company from 1894 to 1900, and manager of that company from 1900 to 1913. As manager of other metal enterprises, director of banks and trust companies, he developed extensive mining interests. Together with Theodore P. Holt, he invented the Holt Dern ore roaster. He is owner of the Holt-Dern patents. He became general manager of the Holt-Christensen Process Company.

He was a member of the Utah Senate from 1915 to 1923, and a member of the State Council of Defense during the World War. In 1924 he was elected Governor of Utah, an office which he occupied ably until 1933. He was chairman of the Governor's Conference in 1929 and 1930.

Secretary Dern is the author of the Workmen's Compensation Law, the Corrupt Practices Act, and the State Mineral Land Leasing Law. In 1933 he was appointed Secretary of War in the Roosevelt Cabinet.

Descartes (*dā-kärt'*), **Rene,** a French philosopher and mathematician, generally regarded as the father of modern philosophy, was born at La Hayre, near Tours, France, on March 31, 1596. He was of Hebrew parentage. At the age of eight he entered the Jesuit College of La Fleche. He was an apt scholar, but upon leaving college in 1612 he found it impossible to believe what had been taught him and what was, at the time, held to be accurate knowledge. At the age of sixteen he went to Paris and spent two years in social life. He threw away his books and strove to forget all he had learned, so as to leave his mind free to find out what was really true in all departments of thought and study. In 1614 he withdrew to a secluded house in the Fauborg St. Germain in order that he might pursue several mathematical investigations and reflect upon philosophy. In 1617 he enlisted as a soldier under Maurice of Orange, but never saw active service. At the opening of the Thirty Years' War in 1619, he entered the imperial service in Bavaria. It was while he was in winter quarters at Neuberg on the Danube that Descartes experienced a series of dreams which he later believed so inspired him that he "discovered the foundations of a marvelous science." There followed his *Discourse of Method.* From 1621 to 1625, upon leaving the imperial army, he traveled through Switzerland, Italy, Germany, and France, observing human life and nature.

Descartes never married, and in 1629, weary of distractions, settled in Holland where he lived for twenty years. Although he passed these years in constant study and writing, he nevertheless maintained correspondence with the great thinkers in Europe. Thus was his own mind kept continually alert and his reputation extended. In 1649 Queen Christina of Sweden persuaded the now famous philosopher to remove to Stockholm. He died on February 11, 1650.

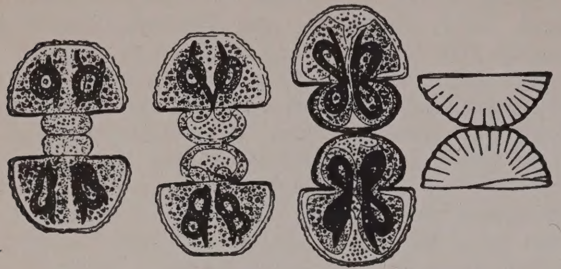
It was in mathematics that Descartes made his greatest and most lasting discoveries, especially in algebra. He was the founder of analytical geometry. The mathematical trend of his mind was even manifested in his philosophy, believing only what must be believed like a mathematical axiom. Upon such a foundation he developed that well-known formula, *Cogito, ergo sum,* "I think, therefore I am." He set forth the essence of his doctrine in *Discourse of Method* which was published in 1637. His philosophical doctrines were also set forth in his *Metaphysical Mediations* (1641), and *Principles of Philosophy,* 4 vols. (1644). His method of reasoning is known as the deductive method, and his works have greatly influenced metaphysical thought.

Deschanel (*dā-shȧ-nĕl'*) **Emile Auguste,** a French littérateur and member of the Senate, was born at Paris on November 14, 1819. His most important writings are *Aristophanes; Benjamin Franklin; The Theatre of Voltaire,* and *The Romanticism of the Classics.* He was exiled to Brussels for opposition to Napoleon III. He died in 1903.

Deschanel, Paul Eugene Louis, a French statesman and journalist, was born in Brussels in 1856, the son of Èmile Deschanel who was in exile there because of his opposition to Napoleon III. Paul Deschanel removed to France when he reached manhood and in 1885 entered the French Chamber of Deputies. He became vice-president of that body in 1896. From 1898 to 1902 he was its president, serving his office so well that he again occupied that position from 1912 to 1916. In January, 1920, he became President of France. His health failed him, and in September of that year found it necessary to resign.

M. Deschanel had already won signal honors in the field of literature. In 1899 he was elected to the French Academy. Among his most noted works are: *Les intérêts Français dans L'océan Pacafique* (1887), and *La République Nouvelle* (1898). His *Gambetta* was published in 1920.

Desmids (*dĕs'mĭdz*), a group of plants belonging to the green algæ, but different from the ordinary forms. The plant-body consists of a single cell which is always composed of two similar halves, usually separated from one another by a deep constriction. The desmids occur in a great variety of forms, and their walls are often ornamented by delicate markings. The markings and patterns of these peculiar bright green cells make them favorite objects under the microscope.



DESMIDS

Des Moines (*dā-mŏin′*), the capital and largest city of Iowa, is on the site of Fort Des Moines, which was a United States garrison in 1832 and at that time the farthest west of the northwest forts. At present this fort has new and modern equipment, making it one of the finest posts in the United States. It is situated in a lovely valley of the corn and blue-grass belt, surrounded by sloping hills, and is rich in coal-mines and deposits of clay and shale. Among its products are wire-fencing, carriages, pork and cotton and woolen goods, brick, sewer-pipe, etc. The output of 25 or more brick and clay-product factories exceeds 1,500 carloads annually. It is one of the leading railroad-centers of the country, having nine trunk-lines, which operate 19 distinct roads in and out of the city, besides electric-car service. Des Moines is the home of 44 insurance companies, has 94 churches, several colleges and technical schools, 47 public-school buildings, 19 banks, 4 daily papers, etc., and has a large jobbing trade. Population, 160,000.

De Soto (*dă sō′tô*), **Fernando,** was born at Estremadura, Spain, about 1498, of a good but poor family. He proceeded under other captains on a voyage to Darien in 1519 and on an expedition to Nicaragua in 1527. He helped Pizarro to conquer Peru, and returned to Spain with a fortune. Charles V now gave him permission to conquer Florida at his own expense, and made him governor of Cuba. In 1538 he sailed with 600 men, 20 officers and 24 priests. The little fleet anchored in the bay of Espiritu Santo (now Tampa Bay), on the 25th of May, 1539. The ships were sent back to Cuba, and the long search for gold was begun For three years, harassed by Indians, lured onward by reports of wealth that lay beyond, the ever-lessening company kept up their wearisome march over a route that cannot now be clearly traced. In 1541 the Mississippi was reached and crossed, and the third winter was spent on Washita River. Returning to the Mississippi in the spring, De Soto, worn out by disappointments, died of a fever on its banks in June, 1542. In order that his death might be hidden from the Indians his body, wrapped in a cloak, was lowered at midnight into the waters of the great stream he had discovered. In the following year about half the number of the companions with whom he had set out sailed down the river in seven frail boats, and at last reached Panuco in Mexico.

Detaille, Jean Baptiste Edouard (*zhŏṅ bäp-tēst ĕd-oo-ärd, dê-tä′y′*), a French painter, was born in 1848, and is distinguished for his treatment of military subjects. *The Passing Regiment* is one of his best pictures. It is in Corcoran Gallery, Washington, D. C.

Detroit, the largest city and metropolis of Michigan, is situated on the Detroit River, which connects Lakes Erie and St. Clair, and is the outlet of the upper Great Lakes. The city is 18 miles from Lake Erie, 7 miles from Lake St. Clair and 284 miles from Chicago. The river at this point runs nearly east and west, so that Detroit lies on the north side of the river, facing the Canadian village of Windsor. It has an area of 35 square miles. From the public square known as Campus Martius the main avenues of the city radiate. Here is the center of the business-district, solidly built, with wide, clean streets and many tall, imposing buildings. Woodward Avenue, the main artery of the city, runs north from the river, extending into the country and dividing the city into two nearly equal parts. On the lower end of this avenue and on adjoining streets is the shopping-district, while farther out, this and adjoining avenues are marked by magnificent churches and the fine residential district. Among the notable structures are the Soldiers' Monument, the County Building, which cost some two million dollars, City Hall, the Elks Temple and the Detroit Opera House. Grand Boulevard a macadamized thoroughfare 150 feet wide and 11 miles long, encircles the business portion of the city. Belle Isle, a beautiful island of about 700 acres, is connected with the mainland by a magnificent bridge and constitutes the main park of the city. It is an island of great natural beauty and has been improved at a cost of over two million dollars. This magnificent park, so beautifully situated and improved, together with the smaller parks which dot the city, and its broad avenues lined with trees combine to make the City of the Straits one of the handsomest cities in the country.

The growth of Detroit has been steady and substantial, resting upon the increased volume of her manufacturing and commercial interests. Its manufactories include foundries, blast-furnaces, copper-smelting works, locomotive and car-works, shipyards, iron-bridge works, safe, furniture, automobile and stove-factories and some of the largest tobacco and cigar-factories in the United States.

The city is the seat of the United States district and circuit courts of eastern Michigan. It has many hospitals and philanthropic institutions, and is noted for the large number of fine churches and its well-equipped public-schools. There are more than 70 school-buildings, besides three high-schools. Here also are the Detroit (R. C.) College, medical schools, law-schools, etc. Detroit is an important railroad-center and is one of the five chief lake-ports.

Detroit is one of the oldest American cities. It came into the possession of the French in 1610, who built a fort here in 1701, called Pontchartrain. The British held it from 1763 till 1796, when it passed to the United States. In the War of 1812, Detroit was captured by Sir Isaac Brock and held by the British for about a year. In 1824 the city was incorporated; from 1805 to 1837 it was the capital of Michigan Territory, and for the following ten years the capital of the state.

Adjacent to the city and commanding it and the approaches to the river is Fort Wayne. Population, about 1,000,000.

Deucalion (*du-kā'li-on*), the hero of the Greek story of the flood. He was the son of Prometheus and the husband of Pyrrha. When Zeus had decided to destroy the race of men by a flood, Deucalion built an ark or ship, in which he and his wife floated during the nine days' flood which drowned all the other people of Greece. On the going down of the waters, the ark rested on Mount Parnassus. To repeople the world, Deucalion and Pyrrha were told by the goddess Themis to throw behind them the bones of their mother. This they did with the stones of mother-earth, and from those thrown by Decaulion, so the story goes, sprang up men, and from those thrown by Pyrrha sprang up women.

De Valera, Eamonn (Edward), Irish popular leader, born near Cork, Oct. 14, 1882. He received a good education and for about ten years devoted himself to teaching. He joined Sinn Fein, but was not active until 1913, when he also joined the Irish Volunteers. He was one of the leaders of the Easter Rebellion of 1916, and in the next year was elected by the Sinn Fein convention "President of the Irish Republic". Though he took part in the early negotiations, he opposed the treaty creating the Irish Free State, and resigned the presidency in 1922.

Development of Animal Life. The building of an animal's body is the most wonderful thing in all nature. An insect, a fish or a bird begins its development as an egg, and, as the construction of the body goes on, each tissue and each organ are formed anew out of the material contained within the egg. After three weeks' incubation of the hen's egg, for example, the young chick steps into the world with heart, brain, eyes and other organs all formed—a remarkable transformation. Frogs' eggs, laid in the water, undergo similar changes without any care from the parent; tadpoles hatch from them, and in due course of time these tadpoles grow into frogs, with a different kind of body. The hen's egg is large, because there is a large quantity of food-yolk stored up for the use of the growing chick; the frog's egg is smaller, because it contains less yolk; and some eggs—for example, those of starfishes—are smaller than pin-heads. The true starting-point of the chick is a microscopic cell within the egg; and, when we look to other animals, we find that all of them, no matter how complex, start in the condition of a single microscopic cell and that, between that simple state and the fully formed animal, which is complex, there are many steps. Therefore, the adult stage of any animal represents the last step in a long series of modifications. If we could only follow the changes, step by step, we should have a means of understanding all about the construction of animals and their past history. Tracing the stages by which cells emerge into tissues, tissues into organs and how the organs by combination build the body is called embryology or development. It is an important fact to keep before us that the rudiment of all life is a cell. (See CELL-DOCTRINE.) If we look upon cells as the bricks of organic architecture, the starting-point of a many-celled animal is a single brick; but, inasmuch as each egg needs to be fertilized before developing—just as a plant-ovule must be fertilized by pollen before it becomes a seed—the single brick is a compound one, made of material derived from each parent. The development of all animals is remarkably alike; from the single cell there come, by division, many cells; these continue to feed on the yolk, to grow and divide; and thereby a large number of cells arises. These cells arrange themselves into definite layers, from which all parts of the body are formed.

The earlier view of development was that the animal existed already formed within the egg, but was exceedingly minute, and that development consisted in the expansion or growth of this animal in miniature. But William Harvey (1598-1657) and Caspar F. Wolff (1733-94) showed the falsity of this view. The latter especially in 1759 showed (in *Theoria Generationis*) the true nature of development to consist in a real becoming or gradual formation, step by step, of the organs and the animal's body. This, of course, was opposed to the view that the embryo was preformed. The acceptance of his work was long delayed on account of the opposition of Haller the great physiologist and of others, but in 1812 it began to receive notice after the long period of neglect, and in the course of a few years the truth that Wolff contended for was triumphantly established. This was the first epoch in modern embryology.

The second epoch was created by K. E. von Baer in showing that all the tissues and organs come from cell-layers or germ-layers. Baer (1792-1876) is regarded as the father of modern embryology. In 1828 he published his great work on the development of animals, in which he showed that the numerous cells, produced by division of the orginal cell, become arranged into three layers—an outer, a middle and an inner layer—and that this is true for all animals above the very lowest. These layers are called the germ-layers, and each one gives rise to a particular set of tissues and organs. For example, from the outer germ-layer there comes, in all animals, the nervous system, including the brain, spinal cord, nerves and sense-organs; the outer covering of the body with parts like scales, feathers, hair. The middle layer splits into two sheets and is very complex. It gives rise, in all animals, to muscles, heart, blood-system, connective tissue, including cartilage and bone, etc. The inner layer forms the lining of the alimentary tube, etc. It is a remarkable fact that the organs of the many different kinds of animals are essentially alike in origin. This fact unites them all on a broad plane and is of great meaning in understanding their history. It is called the germ-layer theory. Modern embryology has largely become a study of the origin and history of the germ-layers.

Another epoch of advance is marked by the work of Kowalevsky, who in 1866 broke down by embryological study the rigid line that was supposed to separate invertebrated and vertebrated animals, and thereby brought them closer together. In 1881 Balfour, one of the greatest of modern embryologists, brought together all that was known about the development of animal life, from sponges to the highest animals, and published it in his *Comparative Embryology*. From that time the advance of knowledge about this subject has been very great, and embryology is looked upon as one of the most important of the biological sciences. It enables us to get at the past history of animals, and throws much light upon their relationships one with another. All animals have had a history. Development shows what that history has been. There is good reason to believe that the higher animals have been derived gradually from the simpler ones. It follows that the higher ones had simpler ancestors, who might have lived very far in the past. In the course of their development animals repeat to a certain extent the story of their past, and, therefore, certain traces of ancestral organs make their appearance. Let us take, for example, the chick developing in the hen's egg. This is a bird; nevertheless, gill-clefts that belong to fishes and smack of a water-life, make their appearance in the developing bird and then fade away. The heart is also, at the same time, two-chambered as in the fish, and the blood vessels are arranged in the gill-arches as in the fish. These rudimentary organs are not of use to the young bird for breathing, but their presence means something; they are not there by chance. The best explanation seems to be that they are inherited from the remote ancestors of the birds, which were water-breathers. Many other rudimentary organs arise and disappear, and are explained in a similar manner. It is an astounding fact that the gill-clefts arise in all of the highest animals, without exception, and their presence is taken to indicate that the remote ancestors of all were water-breathers and had use for gills. The rudimentary organs referred to of course disappear long before the animal is hatched or born into the world. These structures give clues to former conditions, and the traces we find are like records left by the hand of time upon the embryo. The reading of this embryological record is like reading the hieroglyphics and inscriptions made by ancient people upon monuments, temples and columns, but the inscriptions on the embryo go farther back into the past. In like manner, the stages of the frog show its history. The tadpole is at the level of a fish, but it undergoes further changes and transforms into an air-breathing animal. Now, since the most complex organs of animals start in a state of simplicity, it follows that, if we take them in their simplest stages and see all the modifications as they are added, we shall be better able to understand them. This is of wide application, and shows why embryology is so important in zoology and also in botany. Observations on development throw more light on animal-life than comes from any other single source.

Wm. A. Locy.

Devonshire, Spencer Compton Cavendish, eighth Duke of (long known in English politics as Marquis of Hartington), was born July 23, 1833, and educated at Trinity College, Cambridge. He entered Parliament in 1857 as member for North Lancashire, in the Liberal interest, and in April, 1863, was made under-secretary of state for war in Lord Russell's administration. In 1866 he became secretary of war.

and later was postmaster-general in Gladstone's first government. In 1874 he was chosen leader of the Liberals in the Commons, and in 1880 was offered the premiership, but declined. In Gladstone's second administration he was secretary for India; and, when his chief formulated his home-rule policy, became recognized leader of the Liberal Unionist party. In 1895 he was made lord-president of the council in Salisbury's cabinet. In 1900 he became president of the Board of Education, but three years later resigned on the question of tariff-reform. He was chairman of the Unionists' Free-Trade Club. He died March 2, 1908.

Victor Christian William Cavendish, ninth Duke of Devonshire, born May 31, 1868, was educated at Eton and Cambridge. He was governor general of Canada 1916-21.

Dew. Everyone knows that a glass of cold water when brought into a warm room, soon becomes covered with moisture. Careful observation shows that this moisture comes from the air immediately round about the cold object. In the same way, on a clear and reasonably still night, bodies which radiate heat will become cooler than the surrounding atmosphere and will, therefore, condense upon their surfaces some moisture from the surrounding atmosphere. The minute globules of water thus formed are called dew. The only difference between the formation of dew and the deposit of water upon a tumbler is that in the former case it is those bodies which *radiate* heat rapidly that collect the dew most easily, while in the latter case, it is those bodies which *conduct* heat most readily that collect the moisture of the air most rapidly. Two very important facts in connection with the deposit of dew remain to be explained. The first is that dew does not form on cloudy nights; the second is that dew does not form during a windy night. The explanation is as follows: The clouds act as a warm blanket between the radiating body and free space. Compared with the temperature of free space, clouds are very warm, and radiate much heat back to the earth. In the case of winds, if they are at all strong, they will, in passing over any body, communicate so much heat to it that the temperature of the body cannot fall as far as the dew-point, *i. e.*, the temperature at which condensation begins.

De Wet, Christian, a burgher-general in the Boer War of 1899-1902, noted for his great alertness and ability in conducting a guerrilla-warfare, was born in the Orange Free State about the year 1855. Though long a simple farmer and member of the *volksraad*, he took part in the burghers' war against the Basutos and fought against the British at Majuba Hill. In the Boer war he showed himself a skillful strategist, though unfeeling and even brutal as a commander. In 1902 he made his peace with Britain, and in that year he paid a visit with General Prother to England and the United States. He died 1922.

Dew'ey, George, American admiral, was born at Montpelier, Vt., Dec. 26, 1837, and graduated from the United States Naval Academy in 1858. He served with distinction in the Civil War, both in the western Gulf-squadron and in the North Atlantic blockading-fleet, taking part in the battle of New Orleans and in two attacks on Fort Fisher. He was made lieutenant-commander in 1865, commander in 1873 and captain in 1884. In 1897 he was placed in command of the Asiatic squadron as commodore. He became famous by his great naval victory in Manila Bay, May 1, 1898, when he destroyed the entire Spanish fleet without the loss of a ship or a man. He was soon promoted to the rank of rear-admiral, and on March 4, 1899, was made admiral, being the third to hold this highest office in the American navy. In September, 1899, on his return from the Philippines, Admiral Dewey was accorded a great reception by the city of New York and given, with a loving-cup, the freedom of the city. He died in 1917.

De Witt, Jan, a celebrated statesman of Holland, was born at Dort in 1625. He inherited from his father a hatred of the family of William, Prince of Orange, afterward William III of England. De Witt's influence was lost when Louis XIV of France attacked the Netherlands, as it was known that he had favored the French. William of Orange was made stadtholder or chief-magistrate of the state and appointed commander of the Dutch forces. De Witt went to visit his brother Cornelius, who had been imprisoned for conspiracy against the life of the stadtholder, when they were attacked by a mob and both were murdered at The Hague on Aug. 20, 1672.

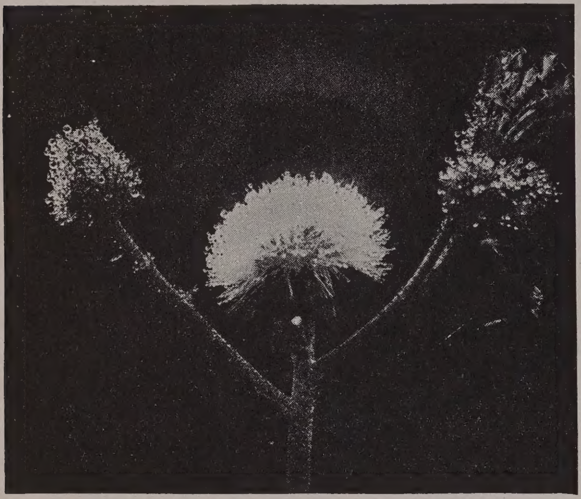
Dextrin. See STARCH.

Dhawalaghiri (*dä-wol'a-ger'ē*), once supposed to be the highest peak of the Himalayas, but now known to be at most only the third in height. It is in Nepal, and is 26,826 feet above the sea.

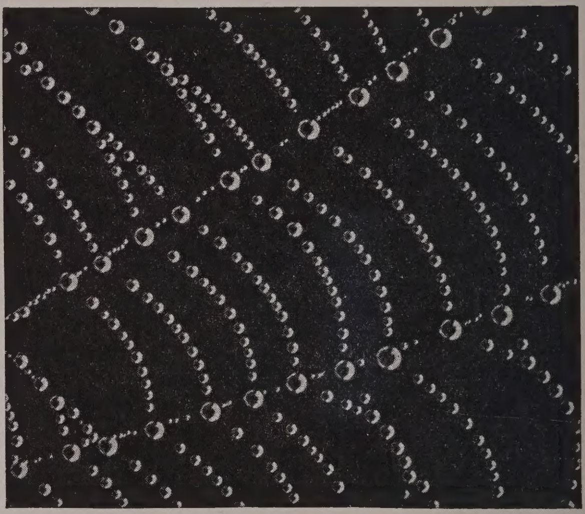
Di'al. A sundial is an instrument for measuring time by means of the motion of the sun's shadow cast by a stile or pin set upon its surface. It is an instrument of great antiquity, and before clocks and watches became common it was in general use as a time-keeper. A dial consists of two parts: the stile, usually the edge of a plate of metal, so adjusted that this edge will be parallel to the earth's axis and point toward the north pole; and the dial-plane or plate, made of any hard substance, on which are marked the directions of the shadow for the several hours of the day. A night-dial is an instrument for showing the hours of the night by the

CUMULUS, A LIGHTLY FLOATING FAIR WEATHER CLOUD.

THUNDER SHOWER CLOUD.



DEW-LADEN FLOWER AND BUDS OF THISTLE.



SECTION OF DEW-LADEN SPIDER'S WEB.

SLEEPING CATERPILLAR DECORATED WITH DEW-DROPS.

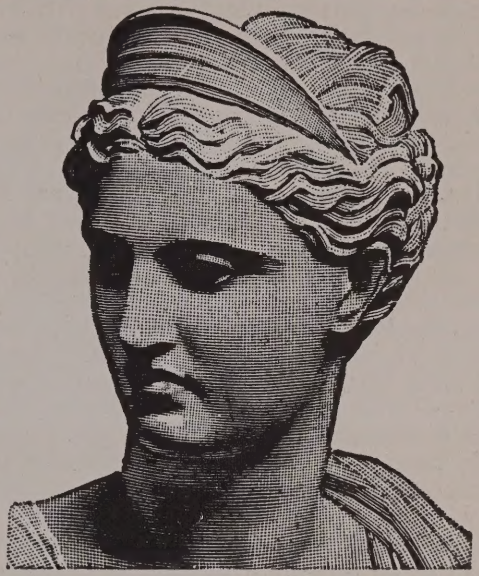
DEW-LADEN GRASSHOPPER ASLEEP ON BED OF FLOWERS.

The wonderfully beautiful photographs of dew and frost and also of snow crystals which we present, were furnished for this volume by Mr. Wilson A. Bentley, who is recognized as the pioneer in microphotography, and who has been employed by the government in this work for many years.

shadow of the moon or stars. It is to be remembered that the time indicated on the dial is apparent time and not mean solar time as given by our clocks and watches.

Diamond, one of the most valuable of the precious stones, is a natural form of carbon. In its natural state it often is of a dull-lead color, but when carefully cut has a brilliancy unequaled by any other stone. It is the hardest of all the minerals, and can be distinguished from other gems by this quality. A stone that will scratch a ruby or a sapphire must be a diamond. Diamonds are usually found in the sand and gravel of river-beds. India was for a long time the only country where diamonds were found, and all the great historical stones of the ancients came from that region. In 1727 diamonds were first found in Brazil. A large diamond weighing 254½ carats when found and 125 carats after cutting was picked up by a negress in 1853 in the river Bogagem. It is known as the Star of the South, and was sold to the Gaikwar of Baroda for $400,000. In 1867 diamonds were found in South Africa, not only in the river gravels but in the rocks. The principal South African diamond-mine is at Kimberley, which produced in 1905 diamonds valued at £6,758,673 (over $33,000,000). There are more large stones found in the mines of South Africa than in India or Brazil. In 1897 the Jubilee diamond of 972 carats uncut was found at Kimberley. In 1905 the Cullinan diamond, an uncut stone of 3,024¾ carats, or 1.37 pounds was found in Transvaal. It is larger than a man's fist, is part of a stone estimated to have weighed nearly 6,000 carats and is approximately valued at $2,500,000. The Transvaal purchased it and gave it to King Edward VII. Diamonds are also found in Australia, in the Ural Mountains, and in several of the United States. In 1906 a diamond-field was discovered in Arkansas. The largest diamond ever found in North America came from Manchester, Va. Artificial diamonds have been made but cost many times more than the natural diamond. Among historical diamonds are the Koh-i-nur, the Great Mogul, the Orloff, the Regent and the Hope diamond. The Koh-i-nur, meaning mountain of light, dates back to 1304. When it belonged to Aurungzebe, it was used as one of the eyes of the peacock which adorned his famous peacock-throne. When the British obtained possession of Lahore, the diamond was presented to the queen of England. The Orloff weighs 193 carats, and is mounted in the scepter of the czar of Russia. The Regent is preserved among the national jewels of France. The Hope, a sapphire-blue brilliant, is one of the most finely colored diamonds known, and is worth $150,000. See Streeter's *Great Diamonds of the World and Precious Stones and Gems.*

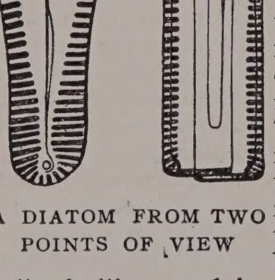
Diana (*dī-an′ā*), a Roman goddess, known as Artemis among the Greeks. She was the twin-sister of Apollo, and was goddess of the moon, the flocks and the chase. She is represented as a young and handsome hunter, carrying a bow and a quiver of arrows and followed by dogs or stags. As goddess of the moon she is clothed in a long robe, her head covered by a veil and a crescent moon above her brow. The most famous statue of her is the *Diana of Versailles*, found in Hadrian's villa near Tivoli, now preserved in the Louvre. Diana of the Ephesians, mentioned in the New Testament, was an Asiatic goddess entirely distinct from the Roman Diana.



DIANA

Diana, Temple of. See Ephesus.

Di′atoms. A group of peculiar plants which are sometimes included among the algæ, and sometimes regarded as a group of thallophytes distinct both from algæ and fungi. They are one-celled, and occur in great abundance in both fresh and salt waters. They are free-swimming or attached by stalks; solitary or in chains. In form they are straight or curved, shaped like rods, boats or wedges. Their chief peculiarity is that the wall is in two halves which fit into one another like the two parts of a pill-box. The wall also is full of silica, and is practically indestructible. Diatoms occur in such vast numbers

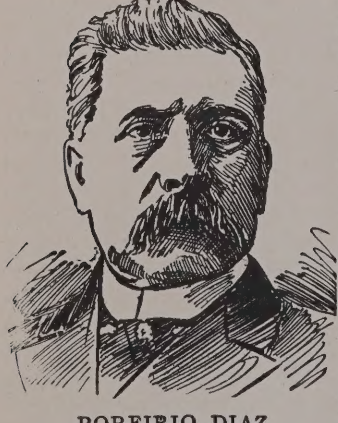


A DIATOM FROM TWO POINTS OF VIEW

in the ocean that they form a large part of the free swimming organisms on the surface, and doubtless their siliceous skeletons are constantly falling on the sea-bottom. There are rock-deposits known as rottenearth, often used in polishing, that are absolutely made up of the skeletons of diatoms. On account of the fine lines which occur upon the siliceous walls, various diatoms have long been used as tests for microscopes, and the group is a favorite one with microscopists.

Diaz, General Armando, who, as commander-in-chief of the Italian forces in the European War (*q. v.*), won the first great victory of the campaign of 1918, hurling the broken and demoralized Austrian army back across the Piave, was born in Naples, Oct. 5, 1861, of an old Spanish family that went to Italy with Charles III of Bourbon in the 18th century. The defeat of the Austrians was, in military importance, one of the great events of the war. For Italy it had a value similar to that of the Marne for France. The brilliancy of the achievement of Diaz and the heroic and resourceful soldiers under his command can be measured by the fact that while the Austrians struck with a million men after six months' preparation, they were not only defeated, but routed by Diaz with the use of only a small part of his available reserves. It is interesting to note this is an instance in which history did not repeat, but reversed itself; for it was fifteen centuries before that Atilla and his Huns drove the ancestors of the Venetians fron the Italian mainland into the marshes and lagoons between the Piave and Sile rivers where they founded the colonies which later became Venice (*q. v.*).

Diaz, Porfirio. In 1877 it would have been unsafe for a well-dressed man to go about Mexico City unattended, while bandits infested the country-roads and robbed the mail-coaches. Thirty years later there were 20,000 miles of railway, 40,000 miles of telegraph and 22,000 post-offices; the capital is lighted by electricity and noisy with steam-locomotives and trolley-cars; and Porfirio Diaz, "perpetual president" of the republic went about afoot or in his carriage.



PORFIRIO DIAZ

To the life of this extraordinary man history offers no parallel. His career, his achievements and his position are unique. Alone and unaided, with ability matched only by incorruptible patriotism, Porfirio Diaz transformed Mexico, lifted it from oblivion, rescued it from bankruptcy, brought order out of three centuries of chaos; won self-respect and the respect of the world for the people of Mexico from 300 years of degradation under Spanish rule.

In 1821 Mexico threw off the yoke of Spain and began its long struggle upward from poverty, ignorance and disorder. In the midst of the turmoil Porfirio Diaz was born on September 15, 1830, in the tropical state of Oaxaca. A typical Mexican of the poor class he was, and of mixed Spanish and native blood, for his grandmother was a Mixteco Indian. His father dying when he was three years of age, the boy roamed the cactus-and-aloe-strewn desert, and often sat at camp-fires with soldiers—government troops or rebels as it happened. At 17 he walked 250 miles to enlist in defense of his country in the Mexican War (1848), and saw half of Mexico's territory signed away to the United States in the year (1849) that gold was discovered in California.

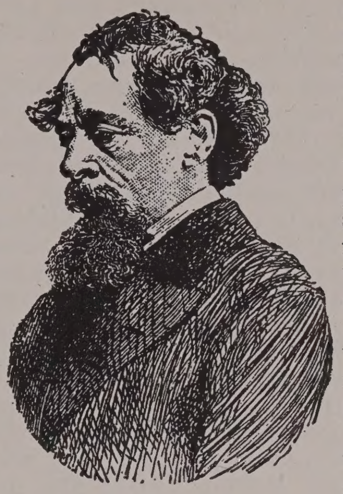
That war over, Diaz became a rebel against Santa Anna's corrupt and oppressive rule. For the next 25 years, in fact, a Mexican patriot had no choice but to be a rebel and outlaw, for the country was ruled successively by dictators, despoilers and invaders. In 1862 President Juarez, thinking to relieve the impoverished land, suspended payment of the national debt to Great Britain, France and Spain. The United States, then in the second year of the Civil War, was unable to resist the invasion of Mexico by 40,000 French troops and the establishment of the Austrian archduke Maximilian as emperor in Mexico City. At the head of a patriot-army Diaz resisted French occupation. He was wounded, imprisoned, was a fugitive and an exile, had his army scattered, was offered bribes to desert his cause; but he helped bring about the downfall of the alien empire. The election of Juarez as president (1871) was the signal for a new revolution led by Diaz. The year 1877 saw the hero of 50 battles installed president in Mexico City by a victorious army.

The fighting stopped immediately, for the first time in 60 years. Mexico was told to go to work, live peacably and pay her debts. In theory the democratic form of government was preserved, but in practice the patriarchal was adopted. Diaz became the fatherly ruler, guiding and restraining. The people were poor and ignorant, the land devastated, perishing. After two generations of treachery, self-seeking and strife, education, industry, civic honesty and peace must slowly build up the land and people. Diaz stamped out rebellion relentlessly. It was years before the world understood his lofty patriotism. It was expected that he would declare himself dictator and then emperor. Rooted deep in the affections of the people, he could have worn a crown. Instead, he cut his official salary to $15,000 a year, and shamed wealthy officials from accepting any salary at all.

When Diaz became president in 1877, Mexico had about 9,000,000 people, of whom 8,000,000 or more were ignorant poverty-stricken peons. When he finally resigned office there were 15,000,000 people with a large middle class of public-spirited citizens. Of railroads it had 500 miles, which grew to 19,000, of which 10,000 were partially government owned. The state revenues of $15,000,000 had been increased to $120,000,000 with a constant decrease in taxes. Thirty years before Mexico had no credit. Under Diaz it had a bonded debt of $200,000,000 and a surplus of $78,000,000. Its debt doubled by depreciation of silver, it adopted the gold standard and met its obligations. The sum of $12,500,000 was expended on Vera Cruz harbor and $30,000,000 on the National Railway and on two harbors on the Isthmus of Tehuantepec. Imports and exports developed from $18,000,000 to $248,000,000. Foreign capital to the extent of $1,200,000,000 was freely invested in Mexican mines, railways, factories and plantations, and $200,000,000 of new money was pouring in every year. Public education had been established, manufacturing and trade were on the increase. The revenues were honestly collected and expended. There were then no public scandals. The uncrowned king of this republic had no private fortune. He lived on his salary of $25,000 a year, in a modest house in the city or in Chapultepec Castle, in simpler style than did many citizens. Once, when Diaz was reported to be seriously sick, Mexican bonds fell several points. Not long after the inauguration of Diaz in December, 1910, there appeared evidences of popular unrest, and early in 1911 there came open revolt under the leadership of Francisco I. Madero. Demands for reforms and broader exercise of popular rights were met by sweeping concessions from Diaz and his cabinet, but still the revolt grew. There was fighting at different points in the Republic, chiefly in the north. At length, rather than see his country deluged in war, Diaz resigned his office as president, and on May 31 he sailed from Vera Cruz for Europe, an exile from the land he had so greatly developed and enriched (See MEXICO.) He died July 2, 1915.

Dichogamy (*dī-kŏg′ ă-my*) (in plants). The condition in flowers in which the stamens and pistils do not mature at the same time. For example, the stamens may be ready to shed pollen when the stigma is not yet ready to receive it, or the stigma may be ready to receive pollen before the stamens are ready to shed it. There are thus two forms of dichogamy, one in which the stamens mature first (protandry), the other in which the stigma is ready first (protogyny). See POLLINATION.

Dichotomy (in plants). The method of branching in which the tip of the axis divides. The contrasting method is monopodial branching. See BRANCHING.



CHARLES DICKENS

Dick′ens, Charles, a great English novelist, was born at Landport, near Portsmouth, Feb. 7, 1812; and died at Gadshill, near Rochester, England, June 9, 1870. When he was nine years old, the family fell into poor circumstances and moved to one of the poorer quarters of London, where the father was soon after arrested for debt, and Charles was placed in a blacking-factory. Not long after, his father was released and Charles was sent to school once more, where he stayed for three or four years. He then prepared himself to be a journalist, and became reporter on a London paper when he was 22. He then began writing for magazines and journals, and in 1836 his success was assured by the appearance of *Pickwick Papers*. Others of his works soon followed, and the remainder of his life was a record of one literary success after another. In 1842 Dickens visited America. His *American Notes* and *Martin Chuzzlewit* are satirical accounts of American manners and life. In 1850 he founded *Household Words*, a weekly periodical, in which several of his works appeared as serials. In 1859 this periodical ceased to be published, but Dickens issued another, called *All the Year Round*, for which were written several other of his novels. Dickens always had a strong liking for the drama, and often acted in private theatricals. His real ability as an actor was shown in his public readings of selections from his works. He gave many of these readings both in England and America, and it is said that his receipts in money from them were more than from all his novels. Perhaps more than any other English writer, Dickens put his own boyhood into his novels. Mr. and Mrs. Micawber are drawn from his own father and mother. *David Copperfield*, probably his greatest work, is said to be largely a story of his own life; while many others of his characters he had met when a boy, in his work at the blacking-factory, when visiting his father at the debtor's prison, at the Portsmouth dock where his father was a navy-clerk, or while he was at school. Few novelists are so universally read; probably no one is so universally liked. His characters are taken from actual life, and call out the best sympathies of the reader. Among his works, besides those already noticed, may be mentioned *Old Curiosity Shop*, *Dombey and Son*, *Little Dorrit*, *Tale of Two Cities*, *Our Mutual Friend*, *A Christmas Carol* and *The Mystery of Edwin Drood* (unfinished). See his *Letters* and the *Life* by Forster.

Dick′inson, Anna Elizabeth, an American lecturer and author, was born at Philadelphia, Oct. 28, 1842. She early began to lecture on temperance and against slavery, and meantime was employed at the United States mint at Philadelphia, but afterward lost her position and then made lecturing her profession. She spoke in the political campaigns of several states in 1863. She was opposed to the election of Lincoln in 1864, and favored that of Greeley in 1872. During the war she delivered many patriotic addresses, and since then has spoken often on woman's suffrage and other questions. In 1875 she went on the stage, writing two plays, in both of which she acted the principal part.

Dickinson, Emily, an American poet, was born at Amherst, Mass., Dec. 10, 1830, and died there, May 15, 1886. A recluse all her life, she wrote much but published little. In 1890, however, a collection of her verse appeared that severe critics recognized as revealing a rare genius and as enriching American literature with minor lyrics of unique form. Another collection was published in 1892, and her letters in 1894.

Diclinous (*dĭk′lĭ-nŭs*) **Flowers.** Those which contain either stamens or pistils, but not both. Staminate and pistillate flowers, therefore, are diclinous. This diclinism may involve not merely the flowers but the plants which bear them. For example, staminate and pistillate flowers may occur on the same plant, in which case it is said to be monœcious. In other cases the staminate and pistillate flowers may be upon different plants, in which case the plants are said to be diœcious.

Dicotyledons (*dī-kŏt′ĭ-lē′dŭns*). One of the two subdivisions of the great plant group *Angiosperms*. Dicotyledons are the highest group of plants in rank, and they also contain more species than any other group, nearly 100,000 having been described. They are herbs, shrubs and trees of every variety of size and habit. The name comes from the fact that the embryo develops two cotyledons. The other features which distinguish the group in general are the structure of the stem, in which the woody bundles form a hollow cylinder; the netveined leaves; and the parts of the flowers in fives or fours. There are two great series of dicotyledons which are distinguished from one another by their petals. In the first series either there are no petals at all, or they are separate from one another. To this series belong the common forest-trees (as oak, hickory, walnut, beech, elm, poplar), buttercups, water-lilies, mustards, roses, legumes and umbellifers. In the second series the petals are united to form urns, tubes, funnels and like forms. To this series belong the heaths, morning-glories, phloxes, gentians, mints, verbenas and composites.

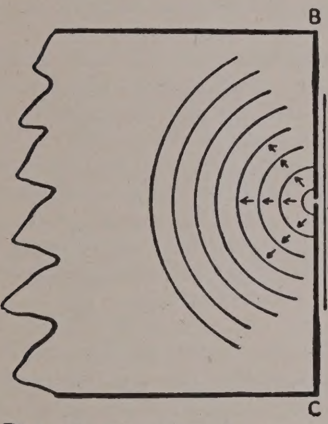
Diderot (*dē′d′-rô′*), **Denis,** was born at Langres, in Champagne, France, on Oct. 5, 1713, of cutlery-manufacturing family. Refusing to become either a lawyer or a physician, his father cut off his allowance, and for ten years he led a haphazard life in Paris as tutor and hackwriter for booksellers. The first book he wrote got him into hot water, as it was ordered to be burned by the government. For writing another he was imprisoned. His commanding position in the world of letters came with his appointment as editor of a new encyclopædia. The various volumes appeared between 1751 and 1765. What the publishers had intended to be an encyclopædia became, in Diderot's hands, an engine of war on what was known as the philosophical party in France. The beliefs and ideas of this party here found expression, and the leaders of the party came to be known as the encyclopædists. When it is called to mind that these ideas were the first entering of the wedge that later upset France in the Revolution of 1789, it will be understood how bitter the government was against these philosophers. Diderot enlisted nearly all the important French writers of the time as contributors. For some twenty years he stood at his post in spite of dangers and drawbacks. The book was again and again threatened with persecution, and Diderot was all the time in danger of imprisonment or exile. Diderot was a very ready writer, and wrote a great deal. He wrote novels, plays, satires, philosophical essays and criticisms of pictures and books. In his later years the author fell into money-troubles, from which he was rescued by Catharine II of Russia, who bought his library and allowed him to keep it in Paris, paying him for taking care of it. Diderot died at Paris on the 30th of July, 1784. See *Diderot and the Encyclopædists*, by John Morley.

Dido (*dī′dō*), according to the old stories the founder of Carthage, was the daughter of the king of Tyre and the sister of Pygmalion. Pygmalion succeeded to the throne, and murdered Dido's husband and her uncle, Sichæus, who was a priest of Hercules, but searched in vain for the treasure that Sichæus was known to have. With this treasure and many Tyrians Dido escaped to sea. She landed in Africa near Utica, and built a city called Byrsa, meaning the hide of a bull, on a piece of land which she bought. It is said she bargained for as much land as could be covered by a bull's hide. Once the agreement was made, she cut the hide into small thongs and so surrounded a large piece of ground, on which rose the city of Carthage. Vergil represents Dido's death to have been caused by the desertion of Æneas, who left her and sailed to Italy.

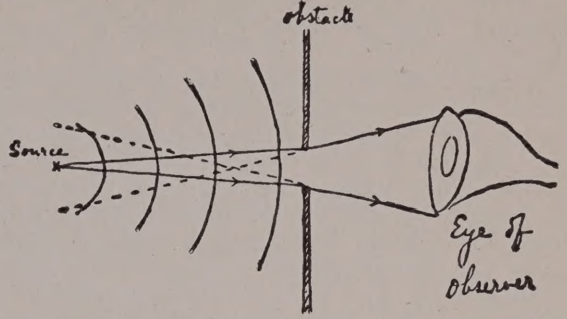
Dies Iræ (*dī'ēz ī'rē*), the name of a celebrated Latin hymn, the title coming from the first line, *Dies iræ, dies illa.* Its subject is the Last Judgment. It first appeared at Venice in 1250. No religious poem has been oftener translated; but no one of the hundred or more versions which have been made is equal to the original in poetic fire and religious fervor. This is Scott's rendering of the first stanza:

> The day of wrath! that dreadful day.
> When heaven and earth shall pass away!
> What power shall be the sinner's stay?
> How shall he meet that dreadful day?

Diffrac'tion, a phenomenon which occurs when waves of any kind pass the edge of an obstacle. The simplest illustration of the phenomenon is perhaps the case of waves washing up against a breakwater with an opening in it. As shown in the accompanying figure, the wave does not pass through the small opening A undisturbed, but spreads out in all directions, giving rise to a series of more or less spherical waves. This spreading out is called diffraction, which is merely the Latin word for bending apart. The easiest waves with which to observe diffraction are light-waves. For this purpose it is only necessary to take a sewing-needle and prick a very small hole in a visiting card. Now hold this hole immediately in front of the eye and look through it at some small or narrow source of light, say the filament of an incandescent lamp. The filament will not appear so bright as without the card, but it will appear much wider, showing that the light-waves from any one point on the filament, in passing through the small hole (that is, in passing the edge of the obstacle) are spread out into a cone, as indicated in the accompanying figure, so that the source of light appears to subtend the angle included between the dotted lines. This phenomenon is known as the diffraction of light. Sound-waves behave in the same way. A beautiful case of diffraction, which may be observed almost any evening on a street illuminated by arc-lights, is the following: a twig of a tree, a lead-pencil or any opaque object will give a shadow on a white card which you may hold in your hand. This shadow will be bordered by two or three lines alternately bright and dark. These bands are due to diffraction past the edge of the opaque obstacle. They were discovered more than 200 years ago by an Italian, and are called, after him, Grimaldi's fringes. The explanation of them, which is too long for this brief sketch, was first given by Fresnel in the early part of the 19th century. See Preston's *Theory of Light.*



The effect produced upon waves by a small opening in a breakwater

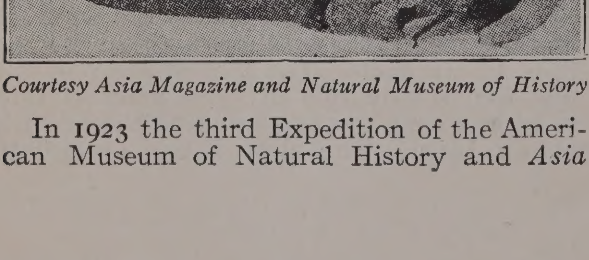


Diffrac'tion-Grating, an instrument for separating from one another light-waves of different lengths. A diffraction-grating is simply an instrument which, when placed in the path of a pencil of light, will impress a different direction upon each different color which is present in the pencil of light. A grating consists of a large series of very narrow, parallel apertures equidistant one from another. The light-waves, in passing through these apertures, are diffracted, and each wave-length is sent off in a different direction from every other wave-length. Just how this happens is too complicated for explanation in this brief sketch. Diffraction-gratings were devised by the distinguished German optician, Fraunhofer. He made them by winding fine wire about two parallel screws cut with fine threads. They are now made by ruling, with a diamond-point, a polished surface, such as glass or speculum metal. The unruled portion acts as an aperture for light, which is transmitted through the grating or reflected from its face. All the best gratings of the world have been made by the late Professor Henry A. Rowland of Johns Hopkins University. Most of his gratings are ruled on speculum-metal with 14,438 lines to the inch; but a few of them have been made with as high as 42,000 lines to the inch. The largest error in the position of any one of these lines is said to be less than one one-hundred-thousandth of an inch. The first thing absolutely essential for the manufacture of a good grating is the manufacture and adjustment of a perfect screw. The reader who desires to learn how such a screw is made should consult Professor Rowland's article on the screw in the *Encyc. Britannica.* For a thorough discussion of the diffraction-grating see Preston's *Theory of Light.* Chap. 9.

Diges'tion in plants is essentially the same process as in animals. It consists in producing such chemical changes in insoluble foods that they become soluble in water, and consequently fit for absorption or transfer; or, when already soluble, in reducing them to simpler forms. There are no special digestive organs in plants comparable to the alimentary canal of animals, with its connected glands; and likening the leaves to the stomach is misleading. Digestion is usually accomplished by the action of enzymes (which see) or ferments secreted by the living protoplasm. (See SECRETION.) In some cases these enzymes are produced in special glands; in others they are formed by the same cells that have other functions. Digestion often occurs outside the plant-body as when the embryo secretes diastase (see ENZYMES) to digest the starch stored around it, or when a fungus digests the cellulose of a cell wall which it is penetrating. Or digestion may occur within the plant-body, as when the starch stored in a potato tuber is digested in order to be transferred to the growing regions, or the starch-granules formed in a leaf are digested to be carried away to places of use or storage.

Dike. See JETTY.

Dinosaur. Ten million years ago the Mongolian basin in northern China, now a desert, was a veritable Garden of Eden. Strange animals roamed over this territory. One was the dinosaur, whose progeny 3,000,000 of years later came over to America across a former bridge of land, and settled in Montana and Wyoming. Here he grew even larger than in Asia, developing three horns. His remains have been dug from rocks in the states above named.



Courtesy Asia Magazine and Natural Museum of History

In 1923 the third Expedition of the American Museum of Natural History and *Asia Magazine*, led by Roy Chapman Andrews, for the first time discovered eggs of the dinosaur. This animal was bony and bulky about ten feet long, with huge round eyes, and hatchet face ending in a beak. He was of the order of reptiles, and while it was never known until the discovery was made, it was conjectured that progeny was produced through eggs. The Expedition found three eggs in a cluster one day, and five eggs similarly placed a few days later. Near the eggs the skeletons of baby as well as grown dinosaurs were found. No other skeletons were discovered near the eggs.

It was in the high deserts of Mongolia that the Expedition also found the skull of the largest known land animal, the baluchitherium. He ate from the tree-tops, millions of years ago when this region was fertile and covered with verdure. His shoulder stood at a height of thirteen feet from the ground, and his neck and head reached eighteen feet higher. His body was huge and bulky, and ended in a long, thick tail. He was the ancestor of our modern comparatively small and insignificant African rhinoceros.

Diphtheria (*dif the'ria*), one of the most contagious of diseases, and dangerous unless immediate care is taken to check infection. The symptoms appear gradually, with sore throat, depression, sleeplessness, and white patches which begin on the tonsils, spread to the larynx, and in acute cases affect the esophagus, which may cut off the passage of air to the lungs and cause strangulation. There is also danger of heart failure.

The disease is caused by germs—the Klebs-Loffler bacillus—and diagnosis is sometimes dependent upon examination of the phlegm. Meningitis and Bright's disease are possible after-effects. The disease should be treated early, and the patient placed under the care of a physician. Since the germs are known, an antitoxin has been developed. This, injected into the body of the patient, counteracts the poisons of the germs. Relief by injection of antitoxin may occur in less than half a day, and the spread of the infection is checked. Deaths from diphtheria have diminished one-half since the use of the diphtheria antitoxin. Disinfectants sprayed on the throat also help in combating the disease. Summon a physician. He will direct you in matters pertaining to the treatment of the disease and the comfort of the patient. Careful nursing is necessary.

At times the disease becomes epidemic, and it seems to be on the increase. It affects both children and grown persons, but is especially contagious among children under the age of ten. All phlegm and discharges should be treated with antiseptics, the house fumigated, and all clothing and cloths disinfected. Great care should be taken that other members of the family are not unduly exposed to the disease. Follow carefully the directions of the physician.

Diocletian (*dī'ō̇-klē'shan*), **Valerius Diocletianus,** a Roman emperor, was born in Dalmatia in 245, and reigned from 284 to 305. He entered the army and held important commands under the Emperors Probus and Aurelian. After the death of Numerianus he was chosen to succeed him by the troops at Chalcedon. With his reign began a new form of government in Rome. He appointed Maximian as his companion in authority, styling him Augustus, and soon after he appointed Constantius Chlorus and Galerius as subordinate rulers, each with the title of Cæsar. Each of the four rulers had a different capital and governed a different region. In 305 Diocletian, being worn out by work, resigned his position as emperor and went to Salona, in Dalmatia, where he died eight years later. His reign has become memorable for the persecution of the Christians.

Diœcious Plants (*dī̇-ē'shŭs*). Those in which the staminate and pistillate flowers occur on different plants. See Dichogamy.

Diogenes (*dī̇-ŏj'ē̇-nē̇z*), a famous Greek philosopher, lived from about 412 to 323 B. C. He and his father were caught adulterating coins, and compelled to leave their native city of Sinope. He went to Athens, where he got rid of all of his dress and furniture, except his cloak and purse and a wooden bowl, because he believed the more things a man has the greater are his wants. He even threw away the bowl, when he saw a boy drinking from the hollow of his hand. He went to Cynosarges, where he lived in a cask, and in order to harden himself he used to roll in hot sand in summer, and in winter he embraced snow-covered statues. He afterward made a voyage and was captured by pirates, who sold him as a slave in Crete. His master took him to Corinth to conduct the education of his children, and he became famous there. Once Alexander the Great came to see him at Corinth and asked him if there was any favor he could do him. Diogenes replied that the only thing Alexander could do for him was not to stand between him and the sun. Alexander was so struck with his answer, that he is said to have cried: "If I were not Alexander, I would be Diogenes." Diogenes died at Corinth, and a pillar was erected to his memory.

Dionysius (*dī'ō̇-nĭsh'ĭ-ŭs*), **The Elder,** an ancient ruler of Syracuse in Sicily, was born about 430 B. C. When Sicily was invaded by the Carthaginians, he became a general in the service of Syracuse, which was then a republic. In the year 405, he made himself tyrant or ruler of Syracuse. He later continued the war against the Carthaginians, and was at first defeated, but afterward gained a complete victory. He also engaged in many other military expeditions, and was one of the most distinguished rulers of his time. Not content with his military renown, he wrote poems and tragedies, and at one time gained a prize at Athens for a work on tragic poetry. He died at Syracuse in 367 B. C.

Diplomatic Service, that branch of a government's service which has to do with political relations with other nations. It aims to secure between the home-nation and any other nation such understanding as will make for their independence, peace and mutual benefit, but particularly for advantages to the home-nation. The diplomatic serivce seeks to secure its ends without resort to force. It works for such agreements as treaties, alliances and trade-reciprocity. Its work is constructive and educational. The agents of the diplomatic service are (1) ambassadors, (2) ministers plenipotentiary and envoys extraordinary, (3) ministers resident, (4) *charges d' affaires* and (5) secretaries of legation and *attachés*. These agents and their order of ranking were agreed upon by the Congress of Vienna in 1814, and have been quite generally adhered to. These various agencies have developed from the early messenger-service between sovereigns and governments, and were inevitable because something must always be left to the good sense of the messenger. The early heralds or ambassadors carried special messages, but it finally became obvious that advantages would come from having a representative on the ground. The Congress of Westphalia, held in 1648, is usually regarded as the starting-point of diplomacy in the modern sense.

Dipper. See Bear, Greater and Lesser.

Directory, the name given to the executive department of the French republican government by the constitution of 1795. There were in France two legislative bodies like our senate and house of representatives. The directory was composed of five directors, elected by the upper legislative house, corresponding to our senate, from a list of names proposed by the lower body, which corresponded to our house of representatives. One of the number retired each year and a new one was elected. Under their management France was very successful in war, but they did not succeed in quieting internal disturbances, nor did they agree among themselves. Three of the directors, of whom Barras was the leader, managed to get the other two removed and new ones appointed. Many other such changes took place, Barras being the only one who remained a director during the four years the directory lasted. On Nov. 9, 1799, Napoleon succeeded in abolishing the directory, and practically became ruler of France, at first under the title of Consul.

Dismal Swamp, Great, a vast swamp in Virginia and North Carolina, about 30 miles long and 10 wide. The soil is black and spongy, and covered with stagnant pools during most of the year. In the center is Lake Drummond, 6 miles long and 3 wide, the surface of which is 21 feet above the level of tide-water. The swamp is covered with forests of cypress, juniper, gum and cedar, and in its drier parts with beech and oak. Two large canals run through it, on which are carried great quantities of lumber for shipbuilding, railroad-ties, shingles, etc. The great swamp and several smaller ones near were noted hiding-places for escaping slaves before 1865.

Disper'sion, as used in physics, is a phenomenon which occurs when a beam of light composed of different colors is made to pass through a prism or through a diffraction-grating. When a beam of sunlight falls on a glass-prism, we find that the red, yellow, green and blue rays are each refracted in different directions. Dispersion for any particular substance is measured in the following manner: Consider any ray of light which is deviated by the prism through an angle D, and another ray whose deviation is D+d D. Then

$$\text{Dispersion}=\frac{d\,D}{D.}$$

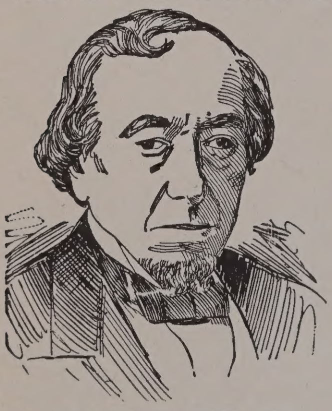
It may be shown that, in the case of a thin prism for which the refractive indices of the two rays differ by d μ,

$$\frac{d\,D}{D}=\frac{d\mu}{\mu^{-1}},$$

and hence the dispersion is measured also by the fraction $\frac{d\,\mu}{\mu^{-1}}$.

The explanation of dispersion lies in the fact that in any one medium, except ether, light-waves of different lengths travel with different speeds.

Disraeli (*dĭz-rā'lĭ*), **Benjamin,** created Viscount Beaconfield in 1876, and a great English novelist, was born at London in 1804. He devoted himself for a time to literature and in 1826 published his first novel, *Vivian Grey,* which was quite popular. Others of his novels are *Contarini Fleming, Henrietta Temple, Coningsby, Sybil, Tancred, The Young Duke, Lothair* and *Endymion.* His works were widely read, because many of them accurately described real persons in the society of his time. In 1837 he was elected to Parliament. His first speech was a failure, the house refusing to listen to him; but as he sat down he said: "I shall sit down now, but the time will come when you will hear me." He gradually became noted as an opponent of Sir Robert Peel, and, after the death of Lord Bentinck in 1848, he became the leader of the protectionist party in the house of commons. In 1852 he was appointed chancellor of the exchequer in the ministry of Lord Derby, and accepted the same position in 1858 in the new Derby ministry. Once more, in 1866, he joined Lord Derby in his third ministry, and was the main author of the reform-bill, which became law in 1867 and gave the right to vote to nearly a million men who had not been able to vote under the old law. Disraeli became prime-minister in 1868, but was defeated in a vote on Gladstone's bill regarding the Irish established church, and resigned in the same year. In 1874 he once more became prime-minister, and was specially occupied with the foreign policy of the country. He resigned in 1880, and died at London on April 19, 1881. See his *Life,* by Hitchman; also monographs by Brandes, Kebbel and Froude. His father, Isaac, was a famous literary antiquarian, writing such interesting books as *Curiosities of Literature.*



BENJAMIN DISRAELI

Dissent'er. The term dissenter has come to have in English history a very definite meaning. It refers to those who dissent from the doctrines of the Church of England, and it emphasizes the view, not that they differ from the church and thus are heretical or schismatical, but that they differ from the sentiment of the English people as it is organized in that church. A dissenter, moreover, is one who is bold in declaring his difference or opinion and in acting accordingly. Burke, in his great speech on American conciliation, speaking of New England as "the dissidence of dissent," thereby signified the resolve of New England's people that in matters of principle and conscience they would not submit to the government of the nation. The dissenting spirit is often referred to under the term: the Nonconformist conscience. In general it has stood for a stricter code of morals than that which is current among the English aristocracy, for strict subservience to biblical teaching and for anti-imperialism. It has been accused of narrowness, of displaying more zeal than enlightenment and of applying abstract principles without regard to the facts of the case.

The earliest dissenters are the Lollards who in Richard II's reign attacked the immorality, worldliness and superstition of the Church of Rome; they came into conflict, thereby, with the national government in the reigns of Henry IV, V and VI. The typical dissenting spirit was aroused in the reign of Henry VIII by the translation and printing of the Bible by

Tindale. The persecutions suffered by the reformers were inflicted by the national and not merely by the clerical leaders. Throughout the Reformation we find men who dissented from the opinion then dominant in the councils of the nation, either going too far in their Protestantism or declining for conscience' sake to follow as far as the national government had gone. In 1558, on the ascension of Elizabeth to the throne, English Protestantism took virtually its present character, and the national church in its independence was firmly established. In 1563 the 39 articles of the English Church were made the test of conformity. Since then a dissenter is any Englishman who boldly asserts that those articles are not in conformity with the Bible and, therefore, are not to be accepted. As the reading of the Bible spread, the number of those who found cause for dissent increased and came to include all classes of people. These were known by the common name of Puritan; and they found their most perfect expression in the stern yet cultured mind of the poet, Milton, and in the fervor of the "inspired tinker," John Bunyan. It was dissenters who formed the backbone of the party that overthrew Charles I, and it was dissenters who established the colonies of New England and Pennsylvania. The extreme spirit of dissent is found in the Quakers. The Independents (Congregationalists), who included Cromwell, Milton and most of the great Puritans, upheld freedom of belief. The Presbyterians desired a national church and general conformity, but to the opinions which they held and not to those current in the Church of England.

The Independents have developed both into what are now the Baptist churches and into the Congregationalists. In 1730 the Congregationalists, Presbyterians and Baptists united for the protection of their civil and religious liberties, under the name of the Three Denominations. In 1739 John Wesley inaugurated the movement which rescued millions in England from the drunkenness and debauchery that were then sweeping the country, bringing them to the fold of the Christian church through the gates of Methodism. For the Church of England was then closed to all missionary zeal; and John Wesley was compelled to organize a separate church. Methodism not only added immense numbers to the ranks of dissenters, but it gave them renewed spirit. The Methodists are now the most numerous of English dissenters. They have been a powerful factor in giving England Sunday-schools and common schools.

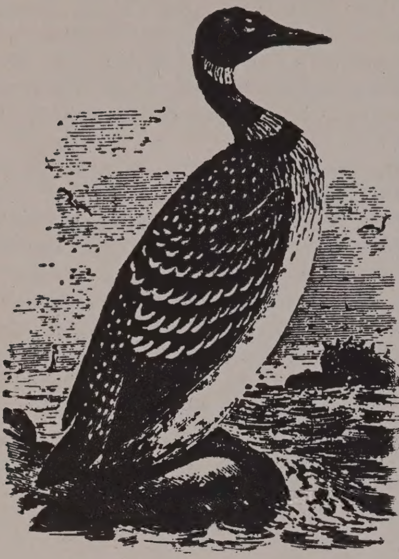
The dissenters aided greatly in the expulsion of the Stuarts and in the establishing of a Protestant and constitutional monarchy under William III and his successors. Since the Church of England still possesses certain peculiar privileges, such as sending its bishops to the House of Lords, the dissenters are determined to secure the disestablishment of that church and the placing of all religions on an equality before the law.

Distilla'tion, a process by which substances which are made into vapor at different degrees of heat are separated from each other, or those which can be made into vapor are separated from those which cannot. The usual method of distillation is by means of a covered boiler connected by a tube with a condenser. Suppose that it is wanted to separate two substances from each other, it being possible to heat one into vapor but not the other. The substance being put into the boiler and heated, that part which can be vaporized rises and passes through the tube at the top into the condenser, which is a box kept cool. The coolness of the condenser lowers the temperature of the vapor and it condenses into liquid, just as steam does on the inside of the cover of a kettle. This principle is used in preparing alcoholic liquors, the more easily vaporized parts of the fermented juice of fruits and grains being separated from the rest, in the form of alcohol, which keeps the flavor of the juice from which it is made.

District of Colum'bia, the territory containing the national capital (Washington City), is bounded on the north, northwest, east and southeast by Maryland and on the west and southwest by the Potomac River and Virginia. Its area is 60 square miles, though originally the area was 100 square miles. It was originally ceded to the United States by Maryland and Virginia in 1788 and 1789. The Virginian portion and the city of Alexandria were given back in 1846. Slavery was abolished in the District in 1862. The affairs of the District are now managed by three commissioners under the direction of Congress, and the citizens have no vote. Half of the District's expenses is paid by the general government, the other half being raised by taxation on the property of the citizens. There also are a court of the District of Columbia, with six judges, and a police-court with one judge.

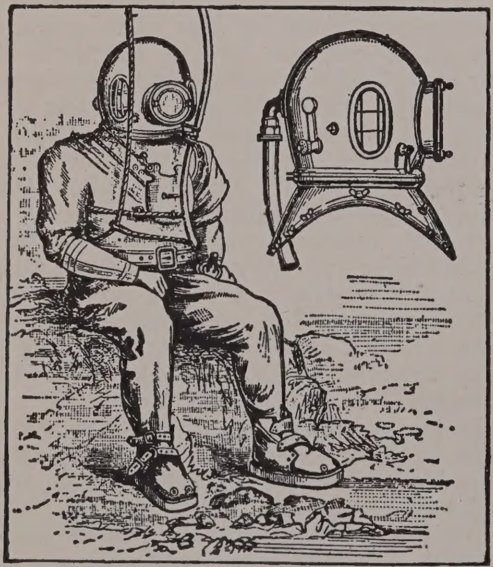
The climate is mild in winter but the summers are long, hot and oppressive to most people, owing to the humidity. Manufactures are not common, printing and publishing being the chief industry. Besides the public schools, there are many educational institutions of different sorts, most of which are in Washington. Among them are Georgetown College, Columbian University, Howard University, the Smithsonian Institution and the National Museum. Population, 500,000

Diver, a water-bird, famous as a diver, commonly called the loon. It is found on both hemispheres, and during the breeding-season frequents ponds and lakes of fresh water, but after the breeding-season is over it seeks the seacoast and salt water. The webbed feet are remarkably far back on the body, and these birds are very awkward on the ground, but they are good flyers and unusually fine swimmers and swift divers. They are difficult to shoot. They are large, solitary birds, seldom more than one pair occupying a lake. The voice is loud and harsh. In June they lay two or three dark, olive-colored eggs in a rude depression in the ground near the water.



GREAT NORTHERN DIVER

Di'ving. The art of diving to great depths under the water to bring up pearls, corals and sponges has been practiced in the Indian seas from very early times. Stories are told of these divers remaining under water for from two to three minutes. In modern times mechanical arrangements of different kinds have been invented to enable divers to stay longer under water. The most important of these is the diving-bell. This was used in quite ancient times, but it was not until the 18th century that it was so improved as to be of any great value. It is a large bell of iron which sinks by its own weight. The air in the bell keeps the water from filling it, but the farther down the bell goes, the greater is the pressure of the water, so that the air in the bells is continually compressed into a smaller space. By attaching a rubber hose to the top of the bell and continually pumping air with a force-pump, the water is kept from rising in the bell. Inside of this bell, therefore, men can breathe and can search for pearls on the bottom of the sea or do anything else under water. Another apparatus used by the divers is the diving-dress or armor. It is an india-rubber suit, with a metal helmet, having pieces of glass in front to enable the diver to see. Lead soles are used for the shoes in order to make the diver sink. A tube is fastened to the helmet through which air is supplied by a force-pump at the surface, while superfluous air escapes through a valve in the face-plate. Other forms of diving-armor are also used. While going down through the water, the diver suffers from severe pain in the ears and over the eyes, but this stops as soon as he touches the bottom. Divers have been known to work at a depth of 201 feet; but 150 feet are as deep as it is safe to work.

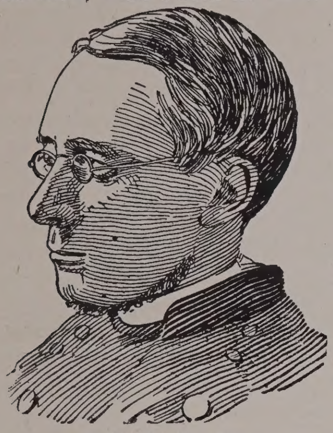


DIVING-DRESS AND DIVING-HELMET

Dix, Dorothea Lynde, an American philanthropist and author, was born at Hampton, Me., April 4, 1802, and died at Trenton, N. J., July 19, 1887. She established a school for girls in Boston, and later gave much of her time to helping criminals, the insane and the poor. In 1834 she went to Europe to investigate the methods of treating these classes, and three years later visited nearly every state in the Union, her exertions being the means of establishing many state insane asylums. During the Civil War she was superintendent of hospital-nurses at Washington. She published several works, among them *The Garland of Flora* and *Prisons and Prison-Discipline.*

Dix, John Adams, an American soldier and politician, born at Boscawen, N. H., in 1798. He entered the army and became a captain in 1825, but soon resigned, studied law and settled in New York, soon becoming secretary of state for New York. In 1845 he was chosen to fill a vacancy in the United States senate, being a Democrat. In 1860 he was appointed secretary of the treasury, and it was he who issued the famous order to the commander of a revenue-cutter at New Orleans: "If any one attempts to haul down the American flag, shoot him on the spot." In 1861 he became major-general of volunteers, and later had command of an army corps. He was in command at New York in 1863 during the riots which then took place; and later had charge of the department of the east. In 1866 he became minister to France; and in 1870 he was elected governor of New York by the Republicans. He died at New York city, April 21, 1879.

Dix, Morgan, American divine and author, was born at New York Nov. 1, 1827, the son of John A. Dix and Catherine Morgan. He was educated at Columbia College and the General Theological Seminary. For almost fifty-three years he was identified with Trinity Church, New York, of which he became assistant-minister in 1855 and rector in 1862. His activities were great as a churchman, and he also was an extensive author. Among his principal publications are *Commentaries on Romans* and on *Galatians and Colossians; The Calling of a Christian Woman; The Seven Deadly Sins; The Sacramental System;* and *Lectures on the First Prayer-Book of Edward VI.* His death occurred April 29, 1908.



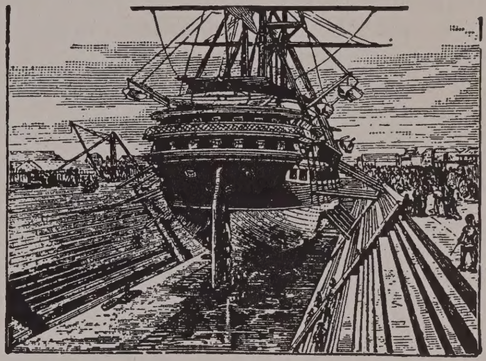
MORGAN DIX

Dix'ie, a name given to the southern states. The name is derived from the popular song which sings of the happiness of Dixie's Land; and it is said that this happy region was given its name of Dixie's Land by slaves, because of the kindness to his slaves of a man named Dixie.

Dnieper (*nē′pĕr*), a river of Russia and the most important river of Europe, next to the Volga and the Danube. It rises at the foot of Voldai Hills, in the government of Smolensk, flows south to Kiev, and finally into the Black Sea. It is about 1,200 miles long, and has several large tributaries, all of which are navigable; but, owing to many natural obstructions, it is not so important for commerce as it otherwise would be. The Russian government has greatly improved the course of the river by taking away many of the obstructions and by building canals around some of the cataracts. Canals connect the Dnieper by means of its tributaries with the Duna of Niemen and Bog, and thus join the Black and Baltic Seas. It passes through the richest provinces of Russia, and at Smolensk is covered with ice from November to April. There is a fine suspension bridge, half a mile long, at Kiev. The river was anciently known as the Borysthenes, and was thought to be the largest river in the world, except the Nile.

Dniester (*nēs′ter*), a river of Galicia, in eastern Europe, rises in the Carpathian Mountains and flows southeastward into Russia, entering the Black Sea about 30 miles south of Odessa. It is about 760 miles long, the chief towns on its banks being Mohileff, Bender and Akerman. Navigation is interrupted by falls between Yampol and Bender, though an artificial channel permits the passage of small boats. In February and June there are severe floods, often raising the level of the river 20 feet and causing great damage along its banks by the swiftness of its current.

Docks are basins for receiving ships, and are of two kinds, wet and dry. A wet dock is a basin in which ships load and unload their cargoes. Where the tides cause great changes in the level of the water, the dock is walled in and the water inside is thus kept at one level. Dry docks are of two kinds: the stationary dock and the floating dock. They are used in order to get at that part of ships which is under water, in order to mend them. The stationary or graving-dock, as it is sometimes called, is made of stone or timber, the sides rising in steps. The entrance is closed by gates, and after the ship has entered the dock the water is pumped out, leaving the ship resting on timbers arranged for that purpose. Floating docks are of various sorts, their object being to raise vessels out of the water. One of these, which may be given as an example, is made of iron in the form of a long box without ends. Inside are compartments filled with water, causing the whole to sink below the bottom of the ship, which is then towed on to it. The water is then pumped out of the compartments, thus allowing the dock to rise with the ship upon it. Among the finest wet docks are those at London Liverpool, Havre, Antwerp and Brooklyn, N. Y. All ports of any size have dry docks. One of the most wonderful feats of navigation was the towing of the dry-dock *Dewey* from the United States to Manila *via* Suez Canal, in 1907. See *Harbors and Docks*, by L. F. Vernon-Harcourt.



DRY DOCK

Dodd'ridge, Philip, an English clergyman, was born at London in 1702. He studied theology at the Academy of Kibworth, and several years later took charge of the academy himself, moving it to Northampton, where he also was pastor. At this academy most of the Protestant ministers who dissented from the Church of England during the middle of the 18th century were educated. After managing the institution for 20 years, Dr. Doddridge sailed to Lisbon for the sake of his health; but died there soon after in 1751. He wrote several works, especially *Rise and Progress of Religion in the Soul*, which were popular in his lifetime. See his *Correspondence and Diary*.

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Dodge, William Earl, an American philanthropist, was born at Hartford, Conn., in 1805. At 21 years of age he went into business in New York and became a successful importer and manufacturer. He was a member of many benevolent and religious societies; and was elected a Republican member of Congress in 1866-67. The Protestant college at Beirût, Syria, was founded largely through his help; and he always was very prominent in charitable work of different kinds. He died at New York in 1883.

Dodge, William E., Jr., born 1832, is the son of the late William Earl Dodge. Mr. Dodge is director of the U. S. Steel Corporation, and is interested also in mining. He has wide and deep scientific interests; and takes a leading part in many benevolent enterprises. Mr. Dodge is president of the Evangelical Alliance and chairman of the International Committee on Arbitration. He is a member of the executive committee of the Metropolitan Museum of Art and of the New York Botanic Garden. He is also a member of the New York Academy of Sciences, the Linnæan Society of New York and the American Historical Association; and is vice-president of the American Museum of Natural History. Mr. Dodge is the donor of Earl Hall, the admirable social and religious center of student-life at Columbia, to Columbia University.

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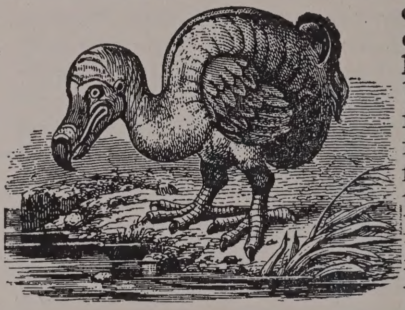
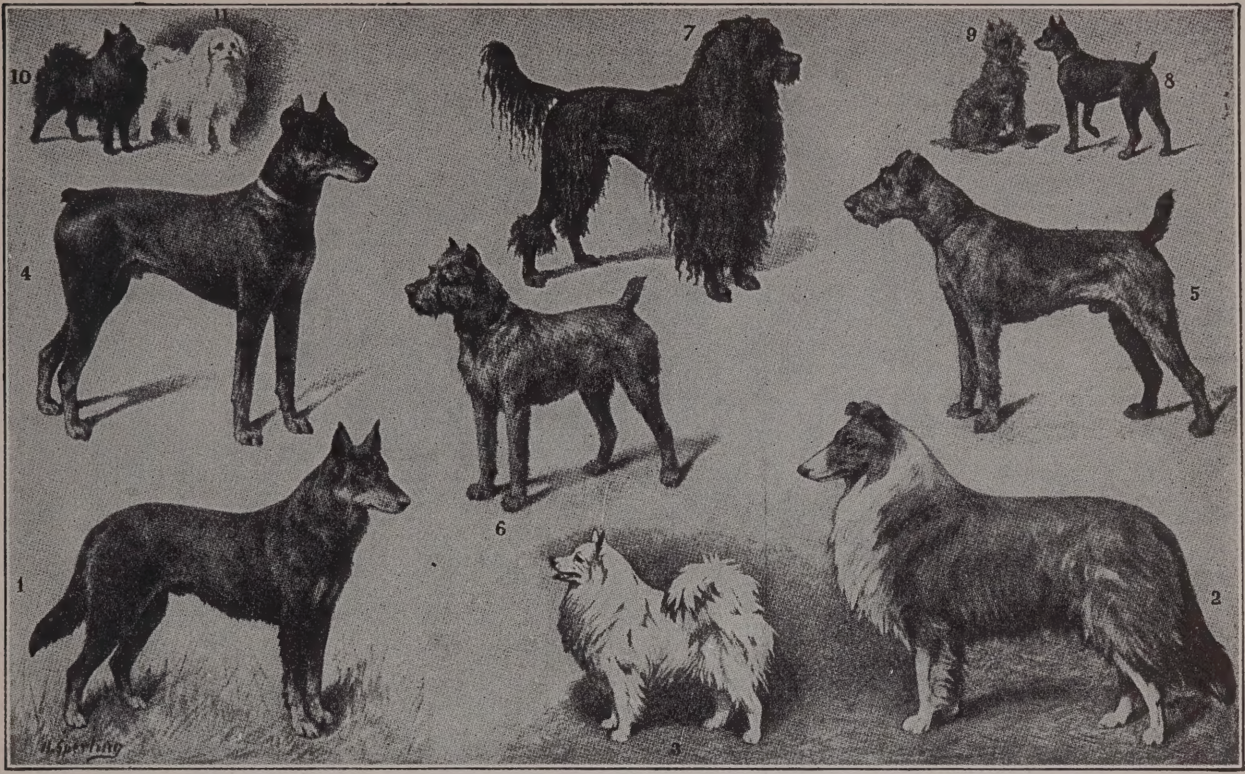

DODO

(From painting in the Belvedere, Vienna.)

Dodo, a bird of curious and ungainly form, extinct since the close of the 17th century. The dodo was a large, clumsy bird weighing from forty to fifty pounds, found only on the islands of Mauritius, Bourbon and Rodrigues. By its structure it was related to the living pigeons. It had a round, fat body, a tail consisting of a few curly feathers, a large head and an enormous bill, the upper part of which was hooked over the lower. Having very imperfect wings, it was unable to fly and was killed by the sailors in large numbers for food. After dogs and hogs were introduced into the islands, about 1644, they began killing the young of the dodo and thereby hastened its extermination. A living dodo was in London in 1638, and was sketched by a number of artists.

Dog, a domestic animal found among all peoples, civilized and uncivilized. Dogs were domesticated before historic times, the first animal domesticated by man. The dog was the only animal the North American Indians had tamed before the coming of white men. Their remains are found with those of man of the stone-age. The Egyptians, Greeks, Romans and earlier peoples all had dogs. It is likely that they are descended from wolves and jackals, but they were tamed so long ago that the parentage of the dog is uncertain. The dogs of uncivilized tribes are still close to the wild state, but the dogs themselves



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H. Sperling

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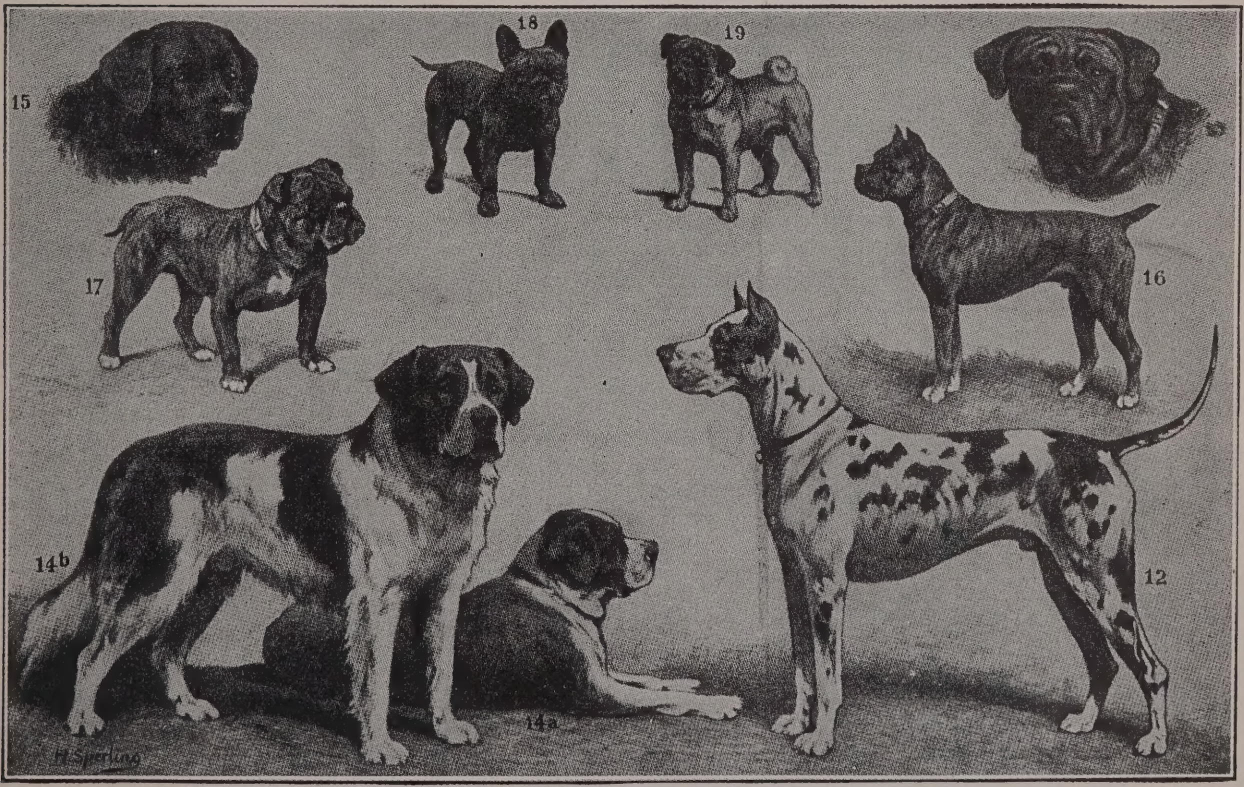

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H. Sperling

DOGS—Plate I

12 German Bulldog 13 Mastiff 14*a* Shorthaired 14*b* Long Haired St. Bernard 15 Newfoundland 16 Bull Terrier 17 English Bulldog 18 French Dwarf Bulldog 19 Pug Dog

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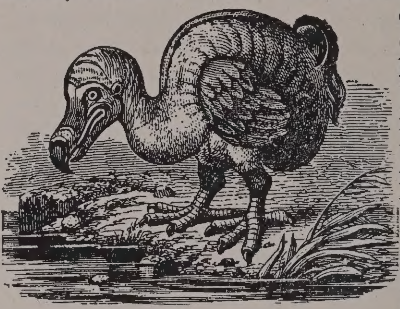

DODO

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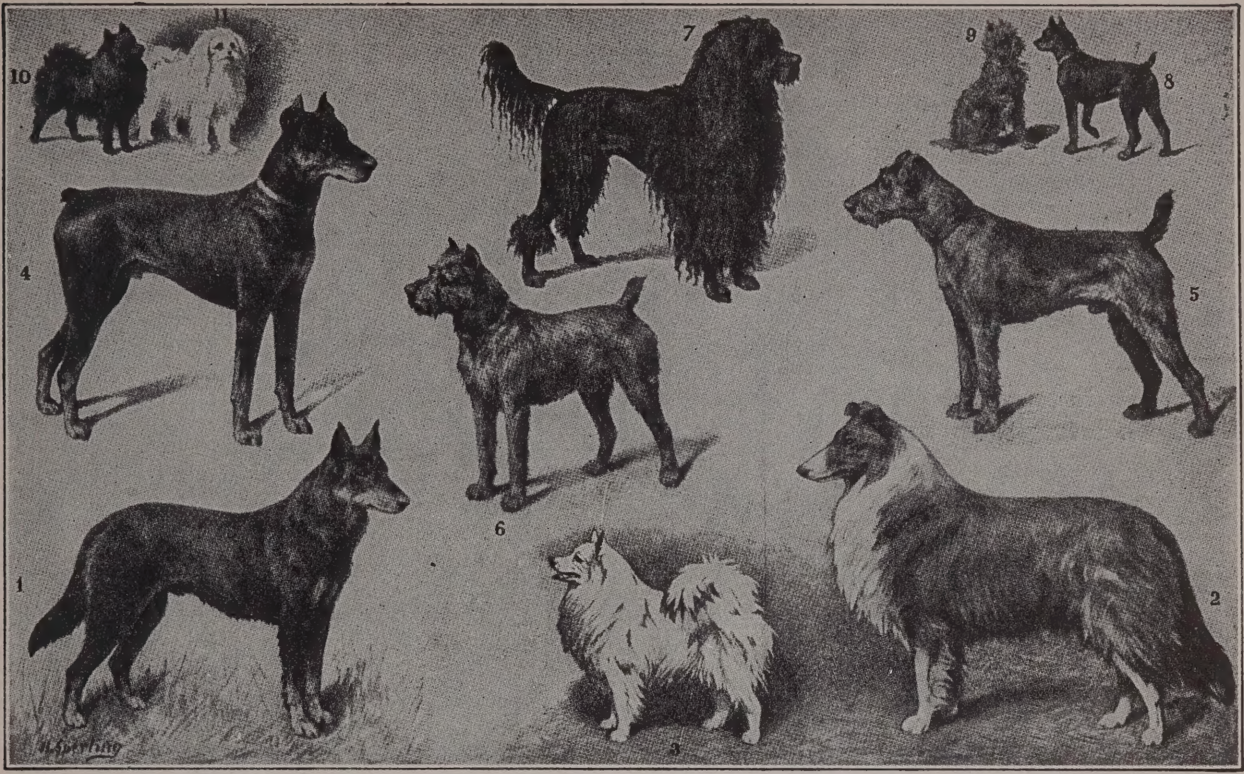
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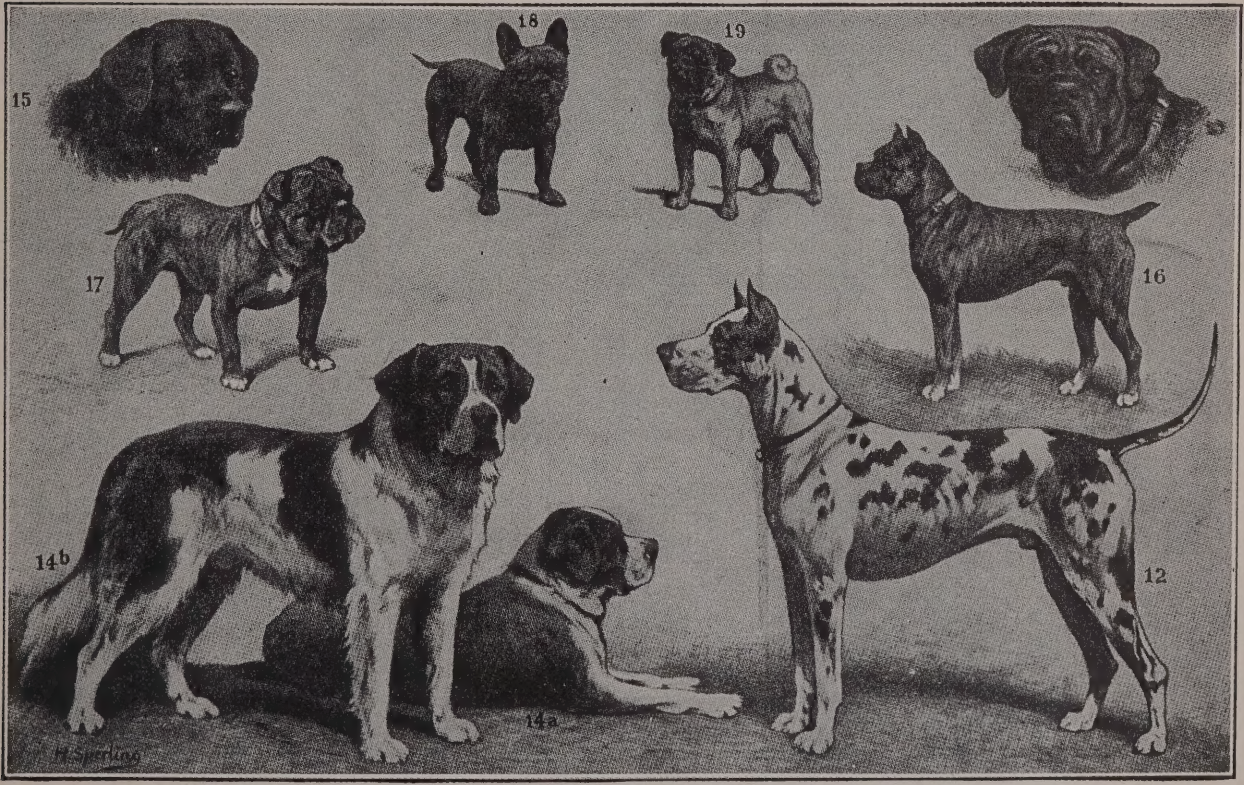
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DOGS—Plate I

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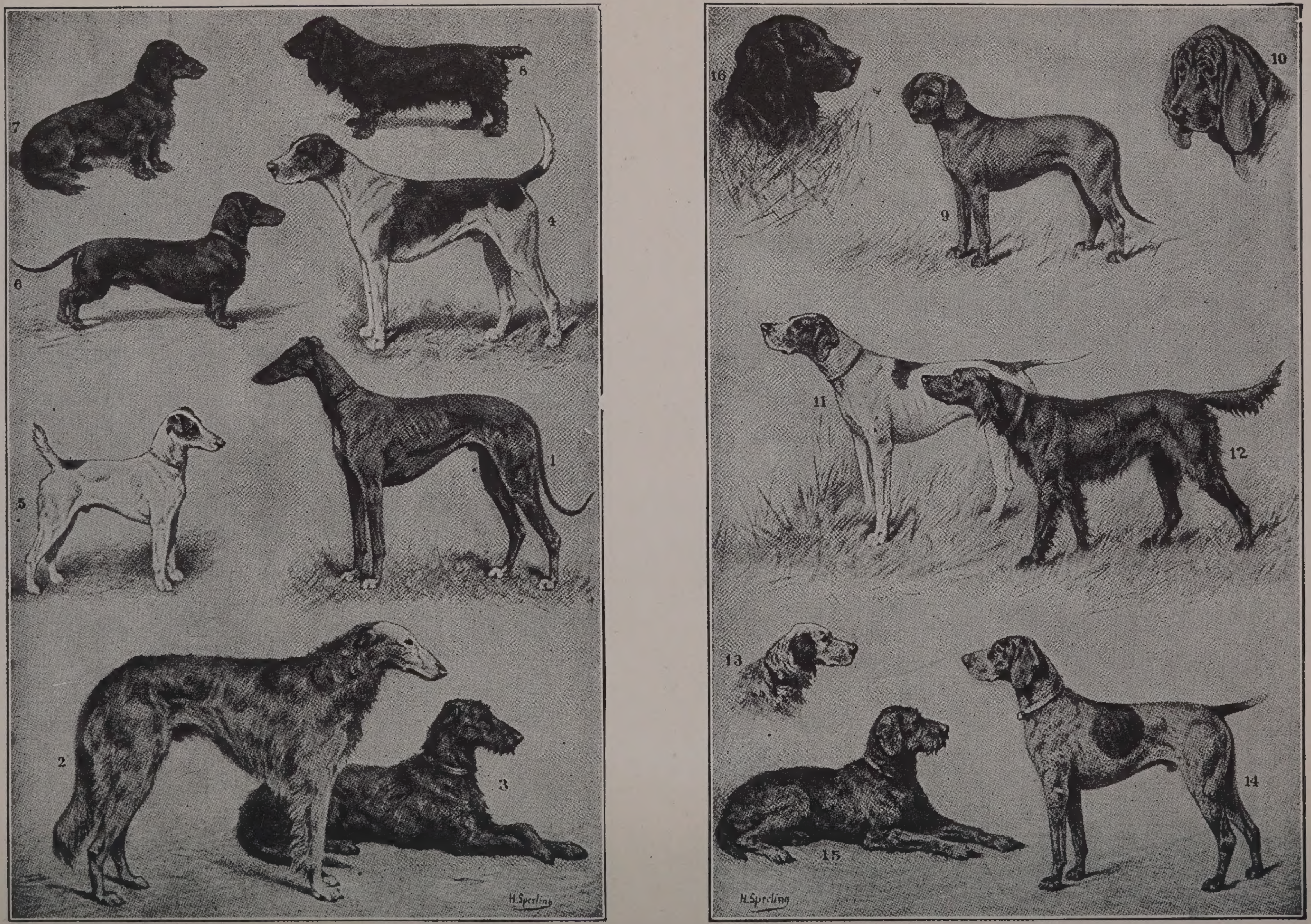
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DOGS—PLATE II

1 Greyhound 2 Russian Hound 3 Scotch Hound 4 Fox Hound
5 Fox Terrier 6 and 7 Short and Longhaired Dachshund
8 Spaniel

9 Bloodhound 10 Bloodhound 11 Pointer 12 Irish Setter
13 English Setter 14, 15 and 16 Shorthaired, Wirehaired
and Longhaired Setters

become civilized in association with a higher grade of people. There now are many varieties, adapted to different purposes, that have been produced by breeding. The chief races of dogs are the wolf-dogs, the hounds, the spaniels, the mastiffs and the terriers. The lowest of the wolf-dogs are those of the Esquimaux, being little more than partly-tamed wolves, while the shepherd-dogs, which belong to the same race, are the most intelligent of all the breeds of dogs. The Scotch collie is one of the best of the sheep-dogs. The Newfoundland and the Great St. Bernard are usually classed with the wolf-dogs. The former seem to be descended from the wolf-dogs of Labrador, and, as their name implies, were imported from Newfoundland. They are expert swimmers, and have saved many children from drowning. The St. Bernards are large, powerful animals. They are kept by the monks of the monastery of St. Bernard, situated on one of the Alpine passes between Switzerland and Italy, and are trained to rescue travelers lost in the snow. By their keen scent they are able to find those that are lost and by loud barking attract the attention of the monks. The hounds make a large group. The bloodhound, a large, powerful animal, with a remarkably keen scent, is now rare, It was used to track criminals and to pursue fugitive warriors. It is said that Robert Bruce escaped from bloodhounds by walking a long distance in a stream of water, and then pulling himself out by an overhanging branch, thus breaking the scent. They were also used by the Spaniards in the conquest of Mexico and Peru. Those that were used in the south in the pursuit of runaway slaves were different from the Old World variety in having shorter ears and a more pointed nose.

The Siberian bloodhound is the dog called the Great Dane, and is now often seen as an imported variety in various parts of the United States. The staghound was a large, fleet animal, slimmer than the bloodhound. It was used in the chase of deer, but is rare now, as the stags of the forests of the Old World have become rare. The foxhound has taken the place of the staghound in England as a dog of the chase. Although smaller, by careful breeding it has reached a high degree of strength and swiftness. The harehound is smaller still, and is used in hare and rabbit hunting. The pointer is supposed to be descended from an old Spanish breed of the hound. It has been trained to stand, and point with its nose, when game is scented, and it, above all others, is the sportsman's dog. The ungainly *dachshund*, with its long body and short, crooked legs, is the German badger-dog. The greyhound stands in a class by itself and is not a true hound. The Irish and English varieties differ as to the quality of their hair. They hunt by sight, and have almost lost the power of scent. They are very slender and noted for speed. The spaniels make another race of dogs. Among them are the common spaniel, the water-spaniel and the setter. These are hunting-dogs, and the group also includes various fancy-pets. The mastiffs form still another race. They have a short broad nose, an enormous head with powerful jaws and a heavy body. The color of the common mastiff is usually buff. It is now used chiefly as a watch-dog, and is rarely met with in its pure form. The bull-dog and the pug belong to the mastiff race. The former is the fiercest of the domestic dogs. It has a thick bullet-head and a scowling expression of the eyes. It is smaller than the mastiff, but very compactly built, and its color is usually brindled or black and white. It is the most brutal of the dogs, and when once its teeth are set it can scarcely be made to let go. The pug presents the appearance of a bull-dog on a small scale, but is timid and good-tempered. The terrier is one of the oldest dogs of Great Britain. It is a bold, active, intelligent little fellow, ordinarily of a black and tan color, with short hair, and is very successful in catching rats and other small animals. Other varieties are the Scotch terrier, the fox-terrier, the Skye terrier, the Irish terrier and the Airedale terrier The bull-terrier is a cross between the terrier and the bull-dog.

In Belgium the dog acts as the poor man's horse; singly, in pairs, by threes and fours, they are harnessed to carts, and often made to draw very heavy loads. In Alaska and parts of the far north the sledge-dog is a creature of prime importance; since the Klondike excitement every school-child has become familiar with the "huskies," without whose aid gold-seeker and explorer would be sadly handicapped. These dogs show marvelous endurance, and are able to draw light loads with great speed. The typical Eskimo dog very closely resembles the gray wolf in appearance, and is a mixture of good and bad qualities; both cowardly and courageous; is an irredeemable thief as regards food, but can abstain for a long time. He seems to take great pride in being of service, and in the sledge-train carries himself as if proud of his task. These dogs do not bark or bay like the civilized dog, their utterance being the wolf-howl.

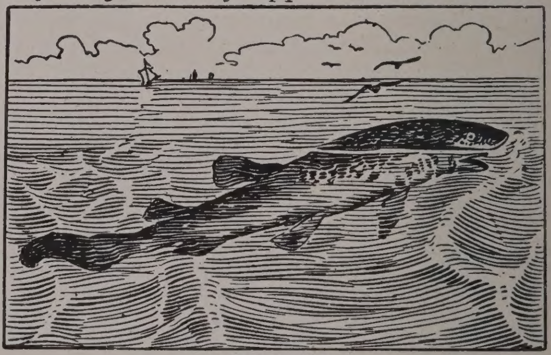
The character of the dog as a pet might well be dwelt on; its faithfulness, unselfish devotion, courage, endurance, intelligence and docility. Though a favorite household associate, few know how to treat this companion and playfellow; as a rule it is overfed, and is neglected in the matter of cleanliness. Hodge in *Nature Study and*

Life proffers this brief advice: "For an adult dog one meal a day, given in the evening, is generally better than two or three. It should consist of dog-biscuit or the coarser table-scraps, bread-crusts, brown bread, oatmeal, bones with not too much meat and vegetables. In severe weather or with much exercise in the open air a dog needs to be fed oftener and to have more food. The best indication as to whether the feeding is proper is the condition of the animal. He should be neither lean nor fat, but *sleek*. One should be able to take up a handful of soft, loose skin anywhere on the dog's body. A gnawing-bone is the dog's tooth-brush, and he should be kept well-supplied at all times, both for business and amusement. Too much meat and a lack of cleanliness are apt to give rise to offensive odors, the 'doggy' smell of animals not properly cared for. Fleas are the great burden of a dog's life. To kill every flea on a dog it is necessary only to lather him completely with some mild, clean soap, let it stay on for two or three minutes, then rinse in clean water or let the dog take a swim." Watson's *Dog Book* and *The Pet Book*, by Anna Botsford Comstock of Cornell University (Comstock Pub. Co., Ithaca), a complete and delightful cyclopedia on the choice and care of pets.

Dog=Days is the name given in ancient times to the period of greatest heat in summer, because along the Mediterrenean this is of nearly the same duration as that in which the Dog-star rose at the same time with the sun. The joining of these two was supposed to have an evil influence on the earth. The period of the rising of the Dog-star with the sun is very indefinite and uncertain. In modern times dog-days are sometimes reckoned from July 24 to August 24, and sometimes from July 3 to August 11.

Doge's Palace, The. In Genoa as well as in Venice there is a palace once owned by the dukes or doges of the city; but while the former dates only from the 17th century and relatively is an insignificant building, the doge's palace at Venice still is a splendid and interesting structure, though it was begun in 1300. Between 800 and 1300 three or four palaces were built for the doges and destroyed. The present building was then started, facing the sea and bordering the Rio del Palazzo Canal. Friezes from the earlier building were inserted in the new one. This palace was some distance from the famous church of St. Mark, but slowly its front was so extended as at length to touch the church. Its rear lines the canal; and there is included an oblong court. The building is but three stories high. For an adequate account of its beauties one must study Ruskin's *Stones of Venice*, Vol. 2; but we may note a few points of interest. The exterior and interior have both suffered much from fire, from robbery by conquerors and from clumsy efforts to restore columns, statuary and paintings. But there remain the striking and unique façades, the beautiful marbles of the exterior walls and a profusion of delicate and elaborate sculpture, allegorical in character, presenting virtues, vices, the ages of man and similar subjects. On the third floor, in the great council-chambers, hang many splendid and famous paintings, including some by Tintoretto. The Bridge of Sighs, celebrated in poem and story, was built about 1590 to join the palace with the new prison then erected on the other side of the Rio del Palazzo. Of course its tragic fame arises from the shortness of the passage from the splendid abode of power to the dark and hopeless dungeons of the prison. But before 1590 the victims of the doge's authority had suffered under the floors of the palace itself. The fascination of the building can be understood only through study of the history of Venice and its institutions, which lent themselves so readily to extremes of splendor and misery.

Dog'fish, the common name for a group of small salt-water sharks and also for a fresh-water fish. The smooth dogfish without a spine and the spiny dogfish with a spine on each of the two dorsal fins are very abundant along the Atlantic coast. They are slate-color above and whitish below, and attain a length of about three feet. They are migratory, going into the southern waters in winter and returning north in the spring. Late in May and early in June they appear on the southern coast of Massachusetts, and work northward around Cape Cod and up to the coast of Maine. They are caught on hooks for the oil contained in their livers. When abundant, they are troublesome to the fishermen, eating their bait and driving away other fish. They carry from two to twelve eggs in oviducts, and the young are hatched within the body of the parent. The fresh-water dogfish (*amia*), often called the bowfin, belongs to the ganoids, a group of fishes with very hard, enamel-like scales.


DOGFISH

Dog=Star or **Sirius,** the brightest star in the heavens, belongs to the constellation of the Canis Major or Great Dog. Its light is estimated at six times as great as that of Vega or Arcturus. In ancient times it was described as of a reddish color, but its light now is white. The spectroscope shows that it is travelling away from us at a rapid rate and that its temperature is probably very much higher than that of our Sun. From photometric measurements it appears that the light emitted by Sirius is probably forty times as great as that emitted by our Sun. It was discovered by Alvan G. Clark that Sirius is a double star having a very faint and close companion.

See ASTRONOMY.

Dogwood, any of various trees and shrubs of the genus *Cornus.* There are about thirty species of dogwood found chiefly in the temperate regions of the northern hemisphere. The European dogwood is generally known as *Cornus sanguinea,* a species ranging from twelve to eighteen feet high. The wood of all species is especially hard and the bark bitter. The fruit is usually small. In France an oil is extracted from the fruit which is particularly valuable in the manufacturing of soap.

The most showy species in the United States is the *Cornus florida* (flowering dogwood) which appears in the early spring. Its bark is said to contain the same substance as found in quinine, particularly valuable in treating fevers. The ordinary bush forms with red and greenish twigs, and white, bluish or red berries. The wood is very hard and fine-grained and is frequently used in inlaying, turning or for tool handles.

Doldrums (*dŏl'drŭmz*), a nautical term which refers to that part of the ocean near the equator where squalls, and baffling winds prevail, oftentimes preventing the progress of vessels in those waters. The term is probably a latinized form of the word 'dull.' In the early days of ocean navigation it came to be applied to the regions near the equator where for months at a time there is intense heat and a dead calm, except for occasional squalls and light, very variable winds. These areas were dangerous to sailing-ships, especially until their exact location was known. The area of doldrums moves north in July and south in January. In the Atlantic it moves between the equator and 10° north; in the Pacific between 15° south and 15° north. At any time the area covers about 5° of latitude. It is supposed that from these areas start both the tropical hurricanes and those currents of the ocean that flow from the equator to the poles.

A person who is in a depressed or sullen mood with some tendency to gusts of temper, is said to be in the doldrums.

Dollfuss, Engelbert, a distinguished Austrian statesman who became Chancellor of Austria in 1932, was born on October 4, 1892, in Texing, a hamlet in Lower Austria about eighty miles from Vienna. His parents were peasants and seeing his mother toil, kerchief bound about her hair, and his brother farming the land day by day undoubtedly influenced the lad who later in life "loved to fight for the agrarians." At the village school the short, stubby boy was continually taunted by his classmates. Even at this early age he fought his comrades merely to silence them. He was a studious chap and set about working his way through the University of Berlin with an undaunted determination. Later he studied law at the University of Vienna and was a graduate student of economics at Berlin. At all times Dollfuss was a "blind and incurable optimist." Ever cautious, this canny, subtle farmer won the love and support of the agrarians in Austria through the "sheer power of a personality," unhampered by sophistication or elegant manner.

It was after the close of the World War that the Lower Austrian Peasants' League was organized. Young Dollfuss, who had served as First Lieutenant in a Tyrolean regiment and been decorated for bravery several times, returned home to once more devote himself to agrarian interests. He was secretary of the Lower Austrian Chamber until 1927. From 1927-30 he was director of that Chamber. Then followed his rise in Austrian politics, the most rapid rise ever experienced by any man since the days of favoritism.

Although he keenly felt that his stubby, stunted figure, (he was but fifty-nine inches tall) and his seemingly unpleasant voice were to his disadvantage, his very simplicity, devoutness of purpose, patriotism, and sincerity, won for him the affectionate name of "Millimetternich." This little man, but a millimeter taller than Napoleon, was not a genius, but he was one of the greatest organizers Austria has ever known. In 1930 he became Minister for Austrian Federal Railways. It was not, however, until May, 1931, that he really entered public life. At that time he became Minister for Agriculture and Forestry. In May, 1932, President Miklas of Austria sent for the young Christian-Socialist and proposed that he succeed Karl Buresch as Chancellor of Austria. He was granted but eighteen hours to offer his decision, a decision which two years later was to cost him his life and snatch away from his wife and two small children, Eva and Rudolph, a devoted husband and father.

The advent of Hitlerism in Germany created new problems for Austria as for the rest of the world. Just one month after Engelbert Dollfuss had become Chancellor of Austria, serious fighting occurred in Graz, Austria, between the Nazis and the Socialists. In September of that same year the Hitlerite convention opened its session in Austria. Fighting between Nazis and Socialists continued. It became quite evident to Austrians that Chancellor Hitler was bent upon establishing a dictatorship. Chancellor Dollfuss led an untiring campaign against the Nazis in Austria. His suppression of the Nazi movement in Austria became more oppressive as Nazi outbreaks spread throughout the country. In March, 1933, the resignation of the Dollfuss Cabinet was demanded by Austrian Nazis. The demand met with a raid by the Dollfuss Government on Communist offices in Vienna and Holléin. In May of that year Chancellor Dollfuss reconstructed his Cabinet and issued a decree whereby all State employés were required to take an oath of loyalty to the Government. Nazi demonstrations were held at Graz in July, 1933, against Dr. Dollfuss. Two months later Dollfuss requested authorization to raise a corps of 8,000 men for duty against Nazi terrorists in Austria. The request was approved by France, Italy and Great Britain.

Dollfuss was slightly wounded in October, 1933, by R. Dertil, a former Austrian Nazi leader. His assailant was sentenced to five years imprisonment. Civil war threatened Austria in 1934 and in February Dollfuss effected the destruction of the Social Democrats, marking the end of the Socialist régime in Austria, and the victory of the Heimwehr-Dollfuss or the Dollfuss-Starhemberg combine which had been organized as a block to the Nazi party. As Nazi terrorism continued Chancellor Dollfuss assumed greater dictatorial powers. On July 11, 1934, the Dollfuss Government resigned to make way for a new Government in which Chancellor Dollfuss held the portfolios of Foreign Minister, Minister of Defense, Minister of Public Security and Minister of Agriculture. An order was issued by the Government on the following day under which court martial could impose "only the death sentence on terrorist bombers or even those caught in possession of explosives. An amnesty was granted those who surrendered their explosive arms or munition." On July 24, twenty-year old Joseph Gerl, a Czechoslovak Socialist worker, was hanged, another stroke by the Dollfuss Government against Nazi terrorism.

Austria's "Millimetternich," that practical economist who consolidated a personal régime into a system which looked towards the preservation of Austrian independence, and the development of a cultural Austria fell in a Nazi attack on the Federal Chancellory in Vienna on July 25, 1934. On that tragic afternoon 144 Austrian Nazis, garbed in Heimwehr uniform, entered the Chancellory, murdered Chancellor Dollfuss and held members of his Cabinet as hostages. Acting upon presentiment, Engelbert Dollfuss had sent his young wife and two small children on a vacation a short time before his death, saying:

"You will be safe where you are going." The children, Eva and Rudolph, were left in care of Benito Mussolini and his wife, Donna Rachele, at Riccione, Italy, as Frau Dollfuss hastened to her husband's bier in Vienna.

Thousands from every walk of life without distinction of class or creed, filed in solemn procession past the bier of a peasant's son, one of Austria's most dynamic, forceful and revered sons since the day of Metternich. Clasping an ivory crucifix, his friendly smile gone, the dead chancellor lay in state in the yellow drawing room of the Chancellory, surrounded by lighted tapers and a guard of honor, the stillness of the chamber broken now by a murmured prayer, now by a stifled sob. The body was removed to the great Gallery of the Vienna Rathaus (city hall) on the day preceding the funeral so that all who would might look upon their leader a last time. Through the black draped streets of Vienna, a ceaseless stream of mourning Austrians passed between lines of soldiers with fixed bayonets to the towering catafalque upon which lay the slain chancellor. Groups of nuns hovered near murmuring prayers continually. On Saturday, July 28, the State bade the tiny chancellor farewell in an imposing funeral. President Miklas of Austria declared, "We will complete his task and strive for a peaceful Austria and a peaceful world. May this, his last wish be fulfilled!" Standing beside Frau Dollfuss and the bent peasant mother of the dead chancellor, Prince von Starhemberg offered his last tribute to his comrade,

"What thou wert and still art will not die! It will remain as long as there is any Austria. In the name of all Austrian comrades I swear eternal loyalty to thine ideals and swear to the last drop of my blood that we will fight for an independent and a free Austria." Following the impressive services in St. Stephen's Cathedral, the chancellor's body was interred in Hertzing Cemetery beside that of his small daughter, Hannerl, who died in 1928.

See Austria; Italy.

Döllinger (*dŭl'ĭng-ẽr*), **Johann Joseph Ignaz,** a German Old Catholic theologian and historian, was born at Bamberg in Bavaria in 1799. At the age of twenty-four his reputation as a writer led to his appointment as professor of church history at the school of Aschaffenburg. Three years later he was appointed professor at the University of Munich. He became prominent in church affairs and wrote several historical works, in all of which he upheld the authority of the pope. He played an important rôle in the struggle which took place in the Roman Catholic Church about the adoption as a church doctrine of the infallibility of the pope. Döllinger was allied with that party of Catholics called the Old Catholics who were opposed to such procedure. In 1871 he was excommunicated by the Archbishop of Munich. In 1874 he met with other theologians of Eastern Anglican and Old Catholic Churches to develop some plan for church unity. He wrote a large number of works, many of them of great value. Among the more important of his writings are: *Paganism and Judaism; The Church and the Churches; The Religion of Mohammed; The Reformation; The First Ages of Christianity; Hippolytus and Calistus.*

Dolomite, also called *bitter spar,* or *magnesium limestone,* is a carbonate of calcium and magnesium in varying proportions, found in rhombohedral crystals, and in extensive beds as a compact limestone. It includes, in the crystallized form, much of the common white marble. It crystallizes in the hexagonal system in forms similar to calcite. It is white through yellowish to reddish or greenish shades, sometimes darker, even brown or black. It has a vitreous lustre, sometimes almost pearly. Dolomite is widely distributed throughout Europe and the United States, both as a mineral and a rock. In the United States it is extensively used as a building stone, from the quarries in Vermont, Rhode Island, New Jersey, New York, and Missouri especially. It occurs both in crystallized and massive form. The crystallized dolomites include the lovely *pearl spar,* which has a beautiful lustre. The massive varieties are often colored. Dolomite containing iron is known as *brown spar;* there is also a reddish variety containing manganese and cobalt. Dolomite can be calcined and slaked to form a cement which is resistant to water. The Houses of Parliament in London were built from English Dolomite, and St. Patrick's Cathedral in New York City was erected from dolomite in that state. Calcined dolomite is used to line Bessemer converters. The mineral treated with sulphuric acid, yields calcium and magnesium sulphates, and is then used in the manufacture of Epsom salts.

The limestone Alps of the South Tyrol, between the Adige and Piave rivers, are known as the *Dolomites.* Strictly speaking the term "dolomite" belongs to the Fassa Mountains, the Langkofel, Rosengarten, and Schlern, only; it is, however, applied also to the Cristallo, Hohe Gaisl, Tofana, Sorapsis, Antelao, Pelmo, and other peaks of the Ampezzo Alps. These mountains are widely known as the "Ampezzo Dolomites". The highest peak in these Alps in Marmolata which rises 11,000 feet. In the World War, the Dolomites were famed, as they were the scene of fighting. The Italians crossed the frontier there during September, 1915, and the artillery fought ahead of the advance of eight miles which cleared Val Cismone in September, 1916. The next year more intensive fighting took place in this region, and a determined Austrian attack was repulsed in June, 1917.

Dolphin (*dŏl'fĭn*), the common name for a number of small whales, also called porpoises. They are not fishes, but mammals. They are dusky above and whitish below, and attain a length of six feet and more. The snout is prolonged into a slender beak, and the mouth is provided with teeth, an unusual thing among whales. Dolphins swim rapidly, and are often seen from the deck of ocean steamers, swimming on the surface and leaping slightly from the water. They are found most frequently in North Atlantic and Mediterranean, North Pacific and Australian waters. Along the British coast is found a rare species, the nesarnak of the Greenlanders, much larger and heavier. It is commonly known as the tursio.

A pure white dolphin is to be found in the seas about China. A form without the usual dorsal fin is found in the South Seas. A bottle-nosed dolphin frequents the New Jersey coast of this country. The name dolphin is also applied by sailors to a true fish that changes its colors when taken from the water. It is this dolphin which is so celebrated in literature.

Domatia, minute shelters of various sorts in plants formed usually upon the under side of leaves and used as dwelling-places by the mites. They are generally formed by hairs roofing over an angle of the veins, or sometimes by outgrowths, folds and pits.

Dom Boc or **Doombook,** a code of laws compiled by Alfred the Great, King of England. They were chiefly taken from the West Saxon collection of his ancestor Ina, with small additions from the Mercian laws of Offa, and the Kentish collection of Ethelbert. Alfred made few original laws, but considerably improved those he found already existent. The Dom Boc begins with an extract from the Bible, followed by the Ten Commandments, parts of the Mosaic law which relate to criminal offenses, and passages from the New Testament, including the Golden Rule.

Dome, usually understood to imply a round roof like an inverted bowl, although the shape is not always that of a bowl. Most of the great domes have an opening or eye at the top, on which stands a little dome, called a lantern. Until recent times they were always built of masonry—stone, brick or tiles—but wood is now often used as in St. Paul's Cathedral in London. The domes of St. Peter's at Rome and of the Florence cathedral are built of stone. The finest dome in America is that of the national capital at Washington, D. C. It was modeled by Crawford. Above the base line of the east front the Dome rises upward 287 feet, 5 inches. It is crowned by a bronze statue of Freedom which is nineteen feet and six inches high. The Dome of the original central building was built of wood covered with copper. In 1856 work was begun upon the present dome which is constructed of cast iron and was completed in 1865. Critics consider this dome superior to that of St. Peter's.

The dome was developed by the Romans. The dome of the Roman Pantheon is undoubtedly the most magnificent dome ever constructed. Among the most celebrated domes of modern times are those of St. Peter's, Rome; St. Paul's, London; and the Pantheon in Paris.

The dome has become a dominant feature of the architecture used in American State capitols. Since steel and concrete have been used in the construction of domes, huge structures have been built at comparatively low cost.

See ARCHITECTURE.

Domenichino (*dō-mā-nē-kē'nō*), or **Domenico Zampieri,** a celebrated Italian painter, was born at Bologna in 1581, the son of a shoemaker. He studied under several masters, particularly Albano Caracci. Domenichino was known as a quiet, studious scholar who never went into society except to study the faces of people in order that he might paint better. In Rome he painted for some prominent men of the day and won a great reputation, but he excited so much jealous opposition among other painters that he left Rome for a time. He was recalled by Pope Gregory XV, who appointed him principal painter and architect to the papal palace. After 1631 he was in Naples where he opened a school; but he was persecuted by the painters of Naples who had formed the so-called cabal of Naples, to keep out all other painters. Their persecution is supposed to have caused his death, which occurred at Naples in 1641.

Domesday (or **Doomsday**) **Book,** the name given to an old record which contains a description of all the lands of England in the time of William the Conqueror. Commissioners were sent out by William, and were met wherever they went by representatives of the people, who told them the name of each estate or manor and the name of its owner; the amount of land, how much was wooded, how much was pasture, and how much meadow; how many mills and how many fishponds belonged to it; and the value of the whole in the time of Edward the Confessor as well as of William. The number of tenants on the land was also given, and the amount of their cattle and live stock, as well as the number of serfs. The king thus obtained a complete account of the wealth of the kingdom and of the military strength of each county in case of war. A record was also made of the lands the possession of which was in dispute. Domesday Book, thus, is now a valuable record for the study of the history of ancient England.

Domestic Art, a subject of study to which the attention of teachers has been directed principally during the last decade, is usually held to include the various household industries and such art-work as may be applied in the home. There, however, is no reason in the nature of the term, why all the branches of domestic economy, including cooking, hygiene, nursing, etc., should not be included under domestic art. At present it is customary to speak of the latter group of studies as *domestic science*, an unfortunate distinction of terms. Let us first consider domestic art in its narrowest conventional meaning. Its field is large still, including, as it does, the place of the household-arts in the development of society with reference not only to their present but to their primitive conditions and the process of their evolution. Domestic art takes into account the place of the work of women in society and the artistic and scientific preparation which is desirable for the due fulfilment of that work. A college-course in domestic-art may include such technical subjects as braiding, netting, basketry, weaving and sewing, with the attendant dyeing and cleansing of textiles, drafting, pattern-modeling, dress-making, millinery and embroidery. It may also include the development of household-manufactures, such as textiles, with their cultural and economic effects; household-art, economics, organization and management; and art-work, for the purpose of cultivating taste and skill in designing for these crafts. This list is taken from the course in domestic art at Teachers' College, New York, where fundamental courses in educational psychology, history and principles and allied courses in domestic science, English, geography, history, manual training and mathematics are also offered to students of domestic art.

Domestic science, which may be regarded as essentially one subject with domestic art, includes certain scientific studies in biology, physiology, hygiene and household chemistry; technical studies in the nature, production, manufacture and manipulation of foods; household-mechanics and sanitation, laundering, home-nursing and emergencies; and social and economic studies in history and household-art and economics. These studies should not obscure practical efficiency, but assist it. It is felt that domestic art and domestic science, as taught in elementary and secondary schools, may do much to improve social conditions and especially to educate foreigners into American habits and modes of life. For this reason it is apt to be one of the principal features of settlement-work; but its value is also widely recognized in elementary and grammar schools, secondary schools, normal schools and colleges.

Domestic Science. The same principles that led to the introduction of manual training into the American public schools for boys led to the institution of domestic-science departments for girls. We are at last learning the lesson that the common work of life may be done both scientifically and artistically and that thus the plane of our living may be greatly elevated.

In the manual-training high-schools of our larger cities domestic science (including domestic art) usually constitutes an important department. Some of the main branches taught under this heading are sewing, dressmaking, millinery, history of costume, drawing, household-design, cooking, dietetics, purchase of commodities, house-sanitation, laundry-work, general household-economics and the care of young children. Emphasis is placed upon a mastery of the underlying principles rather than upon the acquirement of mere skill in the practice of the art.

The opportunities in this line at the present time are very promising. Schools and colleges in many parts of the country are opening new departments of domestic science and calling for well-equipped teachers. There also is a growing demand for experts in dietetics in our hospitals and philanthropic institutions. A normal-school course in domestic science lasts three years.

and includes educational subjects, such as psychology and the history of education, in addition to the regular technical work.

Many institutions in our large cities are now offering excellent courses in domestic science. A few of the most noteworthy are the Teachers' College, the Manhattan Trade-School for Girls and the Girls' Technical High-School in New York; Pratt Institute, Brooklyn; the Manual-Training High-School of Kansas City; Downer College, Milwaukee; the State College of Agriculture at Ames, Iowa; and the Minnesota Agricultural College.

Domingo, St. See Haiti and San Domingo.

Dominic, St., founder of the Dominican order of monks, was born at Colahorra, a village of old Castile, in 1170. At 15 he proceeded to the university at Palencio. The story is told that, while there, he sold his clothes to feed the poor in a time of famine. In 1204 Dominic first became prominent. He then went with the bishop of Osma on a journey to Denmark, and on the way came in contact with the Albigenses of southern France. The legates, whom the pope had sent for their conversion, failed, and were on their way back to Rome, when Dominic met them and with a few followers began the work which the legates had given up. The pope sent a crusading army into the country, and Dominic seems to have gone with it. After the crusade against the Albigenses Dominic formed a society of monks (see Dominicans), and in the course of five years the society spread all over Europe. Dominic died at Bologna in 1221.

Domin'icans, the name by which the disciples of St. Dominic became known. The order was founded in 1216. Its members took a vow to eat no meat, to wear no linen clothes, to fast and to preach continually. They also took the vow of absolute poverty and of obedience to their head; and went about preaching and teaching, begging their living as they went, and thus were often called the Begging Friars or Brothers. In England they were called the Black Friars on account of the black cloak they wore. They soon spread through Europe, and many of the greatest teachers and preachers of the middle ages belonged to the order. See *Life of St. Dominic* by Archbishop Alemany and *The Coming of the Friars* by Dr. Jessopp.

Domitian (*dô-mĭsh'ĭ-an*), **Titus Flavius Domitianus,** the third of the Flavian emperors of Rome, was born at Rome in 51 A. D. When his father, Vespasian, was declared emperor, Domitian was given the administration of Italy by the soldiers until his father's return from the east; but he so abused the power, that, when his father returned, he excluded Domitian from all share in public affairs; and during the rule of Titus, his brother, he still abjured public life and gave himself up to pleasure. On the death of Titus he was declared emperor by the soldiers, and began his rule by attempting a reform in morals and by passing many good laws. In war he was not successful, and was defeated by the Dacians. He became jealous of the better success of his general, Agricola, in Britain, and in consequence summoned him to Rome and probably had him killed by poison. In 93 a revolt of his soldiers on the upper Rhine caused him to become suspicious of everyone, and from that time he became very cruel, great numbers of prominent men being put to death. He was murdered at Rome in 96. It perhaps was in his reign that John the Apostle was banished to Patmos.

Don, a large river in European Russia. It rises in Lake Ivan and flows generally in a southerly direction until it empties into the Sea of Azov, 1,325 miles distant. In some places the river has a width of 1,800 feet. Navigation is bad, except during May and April, when the water is high; and the river is usually closed with ice from November or December to March or April. It is visited in the lower part by two floods each year—one called the cold water, being caused by the melting of the snow along the lower half of its course; the other called the warm water, being caused by the melting of the snow near the upper part of the river. A canal connects the Don with the Volga.

Donatello (*dōn'ȧ-tĕl'lô*) or **Donato,** a distinguished Italian sculptor, was born at Florence in 1386. He learned the goldsmith's trade, which then included all kinds of work in bronze, such as the making of statues, but later he became a sculptor and also a painter. One of his first achievements in sculpture was the statue of St. Mark at the Church of St. Michele in Florence, and it also is one of his best. Others of his great works are *The Baptist*, *David*, *Judith* and *St. George*. The chief man in Florence, Cosmo dei Medici, was his friend and patron. Donatello was a hard worker; 40 examples of his art now exist, there being many more thought to be his, but not certainly known to be so. He died at Florence in 1466. The name also is that of the hero of Hawthorne's *Marble Faun*.

Don'elson, Fort, an historic post in Tennessee on the Cumberland River, 12 miles east of Fort Henry. It was strongly fortified by the Confederates during the Civil War, and in 1862, when held by General Floyd with 15,000 troops, was attacked by Commodore Foote, who was driven back. But the forces of General Grant, coming up from the capture of Fort Henry, defeated the Confederate force, which came out of the fort to meet them. General Floyd and a part of his force escaped during the night, and the following day General Buckner, who was next in command, surrendered with about 14,000 men.

Don Giovanni is an *opéra bouffe* in two acts whose words are by Da Ponte and the music by Mozart. First produced at Prague, Oct. 29, 1787, and then in London at King's Theater, April 12, 1817, it met with extraordinary success. In one respect this opera is preeminent: All its moods and situations are essentially musical. "There is scarcely a feeling known to humanity which is not expressed in some one of the situations or characters." The overture was not begun until the evening before the first representation of the opera, —an extraordinary instance of rapid composition.

Donizetti (*dō̆′nē-dzĕt′tē*), **Gaetano,** an Italian musical composer, was born in 1797. He studied music under several masters, but when 20 years old entered the army. While garrisoned at Venice, he produced his first opera, and soon afterward, obtaining his discharge from the army, he devoted himself to opera-writing. He went to Paris, where his pieces were not very successful; but after gaining much applause at Naples he returned to Paris, and soon gained a great reputation. He received appointments at Naples and the court of Vienna; but a disease, brought on by overwork, affected his mind and he died in 1848. His masterpiece was *La Favorita;* others of his works are *The Daughter of the Regiment, Linda di Chamounix, Don Pasquale* and *The Martyrs.*

Dooley, Mr. See DUNNE, F. P.

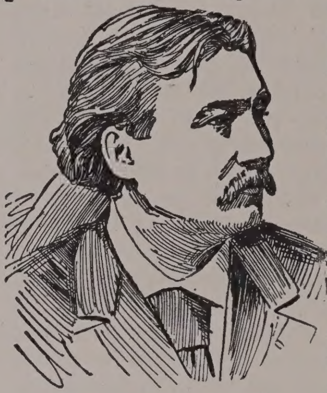
Don Juan (*jū′an* Sp. *dōn hōō-än*), a mythical person, the story of whom originated in Spain and spread throughout most of the countries of Europe. According to tradition, Don Juan belonged to a prominent Spanish family in the time of Peter the Cruel, and lived a life of wild dissipation. In trying to carry off the daughter of the governor of Seville, he was met by her father, whom he killed. He afterward went to the town where the governor was buried, and challenged his statue to follow him to supper. The invitation was accepted, and after supper the statue carried Don Juan to Hades. To this story others of a similar kind were added at different times, Don Juan always being a villain, whose evil life made him laugh at spiritual things. The story was made the plot for plays by Spanish dramatists, and was afterward made the basis of dramas and operas in several countries of Europe. The story, in one form or another, is also to be found in many poems and novels.

Donkey. See Ass.

Don Quixote. See CERVANTES SAAVEDRA.

Dora d'Istria. See KOLTSOF-MASALSKI, PRINCESS.

Dorcas. (1) A gazelle, with long, slender horns, found in Syria and the Sahara. (2) A woman, mentioned in *Acts* ix:39, who made coats and garments for the poor, and was lamented by the widows. (3) Hence, benevolent societies of women who have banded themselves together, usually in connection with a church, to provide clothing for the poor.


GUSTAVE DORÉ

Doré (*dō̆′rā̆′*), **Paul Gustave,** a French painter and designer, was born at Strassburg in 1833. His first success was in landscape-painting, but he soon after began designing illustrations for books. He illustrated an edition of *Rabelais* in 1854 and the legend of the *Wandering Jew* in 1856. These works increased his reputation, and he soon after illustrated a work of Balzac and also drew many of the illustrations for a French journal. Other works which he illustrated are *Don Quixote*, Taine's *Travels in the Pyrenees*, *Fables* of La Fontaine; Milton's *Paradise Lost, History of the Crusades* and Dante's *Works.* He also painted a number of pictures, but is best known as a designer. He died at Paris, Jan. 23, 1883. See *Life* by Miss Roosevelt.

Doremus, Sarah Platt, born at New York in 1802, was noted for her efforts in missions. She was of great assistance in the mission to the French peasants of Canada, and soon after became prominent in work for females in the New York city-prison. She was prominent in the relief of the sufferers from famine in Ireland in 1849, and in 1855 she helped to organize the Woman's Hospital Association. Her labors in behalf of the sick and wounded soldiers during the Civil War entitle her to remembrance. She died at New York in 1877.

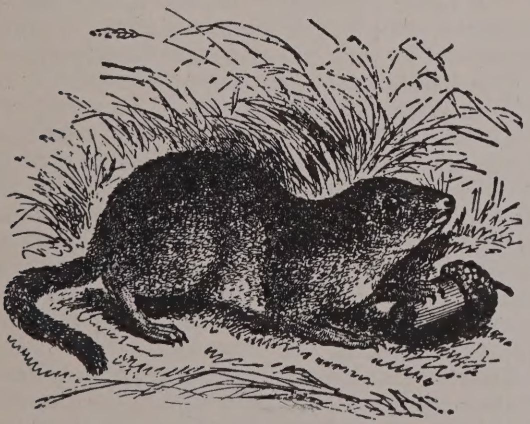
Doria (*dō′rē-ä*), **Andrea,** a famous Genoese admiral, was born in 1468. He belonged to a noble family, and adopted military life. In middle life he entered the service of Francis I of France, who gave him command of his fleet in the Mediterranean, and in 1524 he defeated the fleet of Emperor Charles V near Marseilles. Objecting to some of the plans of Francis, he retired from his service and entered that of Charles and delivered his own city, Genoa, from the French. Instead of making himself sovereign in his own country, he helped the citizens to form a constitution and a republican government that existed until 1815. He was called the Father and Liberator of his Country. He afterward engaged in an expedition against the Turks, and also aided Charles V in the conquest of Tunis. He died at Genoa in 1560. See *The Conspiracy of Fieschi* by Celesia.

Dorians, one of the two foremost races of the ancient Greeks, the other being the Ionians. They claimed to be descended from Dorus, a son of Hellen, and settled in the Peloponnesus. They founded Sparta, Argos and Messenia. Their colonies were planted in Crete, Cyrenaica, Sicily and Asia Minor. The Dorians differed from the Ionians in their simplicity of life and stern and rough but solid character, which showed itself in their manners, laws and dialect as well as in the unadorned simplicity of their architecture. The Ionians, on the other hand, were noticeable for their eloquence and delicacy of taste and for their love of luxury.

Doric Order. See ARCHITECTURE and GREEK ARCHITECTURE.

Dorion, Sir Antoine Aime, Canadian statesman and jurist, was born in the province of Quebec in 1818, and died at Montreal, May 31, 1891. Educated at Nicolet College, he early studied law and in 1842 was admitted to the bar. From 1854 to 1861 he represented Montreal in the old Canadian Assembly, and Hochelaga he represented up to the era of Confederation in 1867. In the Dominion legislature he sat for five years, and was then elevated to the bench of Lower Canada (Quebec province), becoming chief-justice, with a seat in the privy council. He was knighted in 1877. Sir Antoine was in politics a Canadian Liberal, and leader of the French-Canadian *Rouge* party.

Dormouse, a small animal of squirrel-like habits, confined to the Old World. It is related both to the mice and the squirrels, but in structure is intermediate between them. It lives in trees and bushes, feeding on nuts and berries, and sits erect on its haunches like a squirrel when eating. It lays up a store of food for winter, and when cold weather comes it curls up in its nest and sleeps. On warm days it is likely to wake, eat and fall asleep again. Its name signifies the sleeping mouse Dormice are tamed and kept as pets. In the United States the common white-footed mouse is often called dormouse.


DORMOUSE

Dorr, Thomas Wilson, was born at Providence, R. I, in 1805. Under the old charter of Rhode Island, only men who had a certain amount of real estate, and their eldest sons, had the right to vote In 1841 the party in favor of general suffrage formed a new constitution, and chose Mr. Dorr as governor. The government of the state, which was chosen according to the old charter, resisted, and Dorr was arrested, convicted of treason and sentenced to imprisonment, but was pardoned in 1847 He died at Providence, Rhode Island, in 1854.

Dorsiven'tral Habit (in plants), the habit in plant-bodies which exposes two surfaces to different conditions. For example, in a liverwort one side of the body rests upon the soil or some other substratum, and the other is exposed to the light. As a result the two surfaces develop very much unlike. Ordinary leaves are dorsiventral, one surface being directed upward, the other toward the ground. The contrasting term is radial, in which all sides of an organ are exposed alike, as in an erect stem.

Dortmund (*dŏrt'mŏŏnt*), a town of Germany in the Prussian province of Westphalia, about 50 miles northeast of Cologne Near it are many coal-mines, in which several thousand persons are employed Iron-ore also abounds, and many forges and blast-furnaces have been built. The manufactures include tobacco, iron, steel, machinery, porcelain, oil, flour and woolen, linen and cotton-fabrics. There is a large number of breweries. Among the chief buildings are the large railway-station and the old historic churches. During the middle ages Dortmund was a free town, having its own government. Population, 350,000.

Douglas, a thrifty city in Cochise County, Arizona, in which two of the great smelters of the country are located. There is but one smelter in the world larger than the Copper Queen at Douglas, and the Calumet and Arizona follows closely in its output. In one year these two smelters produced 15% of the entire copper-output of the world The ore is supplied from mines surrounding the city, but principally from Bisbee These smelters give employment to 2,000 people, and besides copper they produced gold, silver, lead and other minerals. Other industries are a large cement-plaster works, a brewery and a stone-quarry. Douglas has a fine system of public schools, several churches, a Y. M. C. A. building and an excellent library, which was presented by the Copper Queen Company. Douglas has gas and water-works, an electric light and power-plant, electric street-railways and the service of the El Paso and Southwestern Railroad. Population, 11,000

Doug'las, an ancient noble family of Scotland whose family annals date from the time of William de Douglas, who lived about 1175–1213. From him was descended "the good Sir James," who fought with Bruce at Bannockburn, and, after Bruce's death, fulfilled his last request, to carry his heart to the Holy Land. William Douglas, Earl of Liddesdale, and Sir William Douglas, descended from "the good Sir James," were among the most famous warriors of their time. Other members of the family obtained the earldoms of Angus and Morton. The power of the family was once so great that it was commonly said: "No man may touch a Douglas or a Douglas' man; for if he does he is sure to come by the worse." The family continually engaged in feuds and warfare on the border, especially with the Percy family. A famous member of the family was Archibald, called Bell the Cat. At a meeting of nobles who were debating about a plan to get rid of one of the king's favorites and considering who should do it, he started up, exclaiming: "I will bell the cat." He tried to persuade King James IV not to make the invasion of England, which ended in the battle of Flodden; and soon after the great defeat he died heartbroken. The Douglas family is now represented by the earls of Selkirk.

Douglas, Stephen Arnold, an American statesman, was born at Brandon, Vermont, in 1813. His early youth was one of poverty; but he managed to spend three years at Canandaigua Academy, having the study of law in view. In 1833 he went west and settled in Jacksonville, Ill., where he entered on the practice of law and was so successful that he was chosen attorney-general of the state. He soon after was elected to the legislature, and in 1840 became secretary of state for Illinois. He was judge of the Illinois supreme court from 1841 to 1843, when he resigned and was chosen to Congress as a Democrat; and there he at once became recognized as one of the ablest men of his party. He strongly urged the admission of Texas into the Union, and supported President Polk in the War with Mexico. He was opposed o slavery; but believed that Congress did not have the right to restrict it to any part of the country. Hence he was strongly opposed to the celebrated Wilmot Proviso, which was intended to prohibit slavery in any territory that might be gained from Mexico in a treaty of peace. On the question of permitting slavery in the territories Douglas argued that the people who had settled in any particular territory should decide for themselves. This was the origin of the expression: Squatter Sovereignty. Douglas was elected to the senate in 1847, and in 1854 he introduced the Kansas-Nebraska bill, which provided that their own citizens should determine whether these territories should become free or slave-states. In 1860 the Democratic party split into two divisions, one of which nominated Douglas for president, and the other John C. Breckenridge. The ensuing election resulted in favor of Lincoln. Douglas was strongly opposed to secession, and delivered several addresses on the subject after the outbreak of the Civil War. He died at Chicago, on June 3, 1861. See *Life of Douglas* by Sheehan and *Life* by Flint.

Douglas, W. L. At the early age of seven years this man was apprenticed to a bootmaker, and for eight years he made shoes and lived on his salary of $8.00 a month. Born at Plymouth, Mass., in 1845, and having spent his life so far in a dreary fashion, he enlisted in the army to fight in the Civil War, and was once wounded.

At the close of the war, wanderlust seized him, and he went to Golden City, Col., where, forming a partnership with a Mr. Studwell, he opened a retail shoe store. Three years in this business were sufficient for him; he sold his interest in the business at a profit and returned to his native state, locating at Brockton. Later, with less than a thousand dollars of borrowed capital, he started a shoe manufacturing enterprise which grew until at the time of his death (at Boston, Sept. 17, 1924, aged 82) the output of his factories amounted to 120,000 pairs of shoes a week.

To Mr. Douglas there also came political honors. In 1890 he was elected Mayor of Brockton, and in 1924 (a Republican year) he was elected Governor of Massachusetts on the Democratic ticket.

His name is another added to the long list of those who, starting with nothing, acquired fame and fortune, with honor rightly earned.

Doukhobors. See DUKHOBORS.

Douma. See DUMA.

Douro (*dōō'rō*), a large river of Spain and Portugal. It rises on the frontier of the province of Soria, and flows in a westerly direction until it empties into the Atlantic near Oporto. It is 500 miles long; but navigation is difficult because of rocks and sandbanks, and it is little used for commerce. It has many tributaries, the most important being the Pisuerga.

Douw or **Dow, Gerhard,** a celebrated Dutch painter, was born at Leyden in 1613. He learned the art of glass-painting, and afterward became a pupil of Rembrandt for some years. He became for a time a portrait-painter, but was slow at his work and had trouble in getting anyone to sit for him. He was very exact in every detail in his paintings, it being said that he spent five days painting a hand, and his work was so fine that he had to make his own brushes. His best works are *The Dropsical Women, The Evening School* and *The Village Grocer's Wife.* He died in 1675.

Dove, a name commonly given to small varieties of pigeons, but no clear distinction can be made between doves and pigeons.

Do'ver, the capital of Delaware, and county-seat of Kent County, is about nine miles west of Delaware Bay. It has a state-house and a large state-library. There also are fruit-packing and evaporating-houses, flour-mills, glass, carriage and other manufactories. It is the center of a large fruit-growing district. Population, 3,720.

Dover, a port of England 70 miles from London, on the southeast coast of Kent, on the Strait of Dover. It is 21 miles from the French coast, and is the English seaport nearest to France. It lies in a low valley or basin between high chalk-cliffs, and is guarded by Dover Castle, which is built on the heights east of the town. The town is said to have been founded by the Romans. Elaborate fortifications are also built on the height to the west. Dover is the chief port which connects England and France, and steamers run daily from it to Boulogne and Calais. The city has many relics of ancient times, among which are several old churches. It has a salubrious climate, and is frequented as a health resort. The total tonnage, entered and cleared in 1910, was 3,665,705 tons. Population, 35,000.

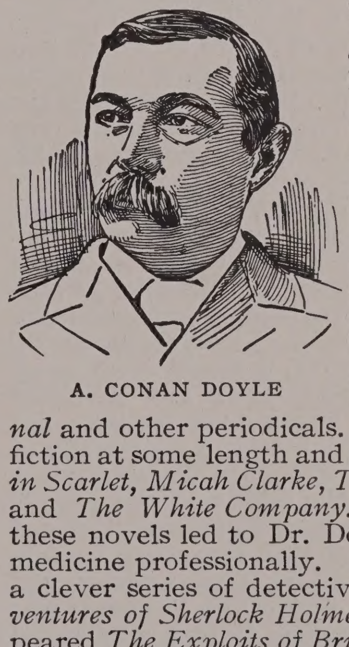
Dover, N. H., a city of southeastern New Hampshire, close to the Maine boundary and about 12 miles northwest of Portsmouth. It is the county-seat of Strafford County and is situated on Cocheco River, from the falls of which it derives its water-power. Being founded in 1623, it is one of the oldest towns in the state. Its site is hilly. It possesses good schools, churches, an excellent public library and other public buildings. It has large cotton mills besides manufactories of leather belting, woolen cloth, flannels, machinery, shoes, and sashes and blinds. Population, 13,247.

Dover, Strait of, the channel which separates England from France and joins the English Channel with the North Sea. It is bordered by chalk-cliffs on the English side, and they also occur in places on the French coast. At the narrowest point its width is 21 and its length 24 miles.

Dow, Neal (1804-97), to whom is due the prohibition-law of Maine, was born at Portland in that state. He was famous as a temperance-orator and the founder of temperance-societies in Canada and England as well as in the United States. He fought in the Civil War, and for the greater part of a year was a prisoner in the hands of the Confederates. In 1880 he was the prohibitionist candidate for the presidency.

Dowden, Edward, LL. D., D. C. L., an Anglo-Irish critic, man-of-letters and professor of English literature at Trinity College, Dublin, was born at Cork, May 3, 1843, and educated at Dublin University He was one of the commissioners of national education in Ireland. His literary industry was very great, for he was author not only of the best *Life of Shelley* extant, but of perhaps one of the most informing as well as critical works on Shakespeare, as to whose works he was an accomplished scholar and editor. His other works embrace a *Life of Southey,* and editions of Southey's, Wordsworth's and Shelley's poetical works; *New Studies in Literature;* and a *History of French Literature.* He died in Dublin, April 4, 1913.

Dowling, The Right Reverend Thomas J., was born in Ireland in 1840, but was educated at St. Michael's College, Toronto. He was parish-priest at Paris, Ontario, for 22 years, administrator of the diocese of Hamilton in 1883, bishop of Peterboro in 1887, and was transferred to the bishopric of Hamilton in 1889.


A. CONAN DOYLE

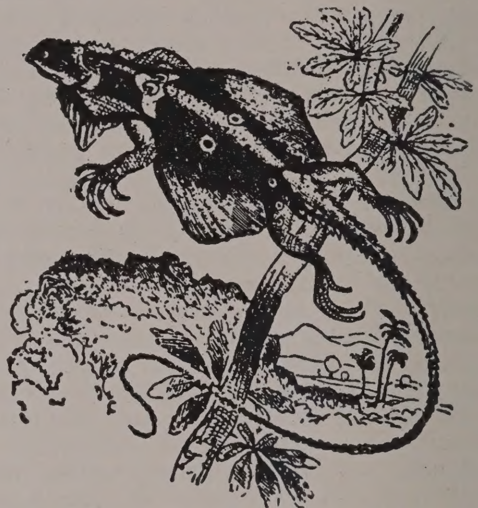
Doyle, Sir Arthur Conan, British novelist and physician, was born at Edinburgh, Scotland, May 22, 1859, and was educated at Stonyhurst, in Germany and at Edinburgh University, where he studied medicine, graduating in 1881 and taking his M. D. degree in 1885. While practicing at Southsea, he began to write for *Chamber's Journal* and other periodicals. He then essayed fiction at some length and published *A Study in Scarlet, Micah Clarke, The Sign of the Four* and *The White Company.* The success of these novels led to Dr. Doyle's abandoning medicine professionally. He then produced a clever series of detective stories, *The Adventures of Sherlock Holmes,* after which appeared *The Exploits of Brigadier Gerard, The Tragedy of the Korosko* and other tales. He has also written verse and a play, *A Story of Waterloo,* which was successfully staged by Sir Henry Irving. Dr. Doyle has been a great traveler. When he visited South Africa and the scenes of the struggles between Britain and the Dutch burghers, the result was a work entitled *The Boer War.* He was knighted in 1902.

Draco (*drā'kō*), a Greek legislator and the author of Athens' first code of laws, was born about 621 B. C. He probably simply put in writing the laws which were customary in his time; but these laws seem harsh and cruel to people of later times. Draco has had to bear the blame of their severity. His laws ordered how a child must be brought up from its birth, and educated, and what his duties were when he became a man. Plutarch says that death was the penalty for nearly every crime. The writing of the laws was probably intended to prevent the archons, who were at the head of the government, from abusing the rights of the people. Nothing is known of Draco's life.

Draft=Riots. These riots resulted from the enforcement of the conscription act, passed March 3, 1863, to fill up the ranks of the army, which was no longer adequately supplied by volunteers or by the state-drafts. Congress divided the north into enrolment-districts, each under the charge of a provost-marshal; he in turn was responsible to the provost-marshal-general, an officer of the war-department. By this act all "able-bodied male citizens of the United States" and foreigners intending to become citizens, between the ages of 20 and 45, were enrolled and became liable to three years' military service. There had been riots in Pennsylvania and Wisconsin over state-drafts, but the most serious were those in New York City. On Monday, July 13, 1863, after the lots had been drawn for about half an hour, a mob of some thousand men began to hurl brickbats and paving-stones into the marshal's office. The crowd increased, the drafting-office was destroyed, and the building fired. The few soldiers available were routed, and the police overpowered. Other draft-offices were set on fire, and the firemen prevented from putting out the blaze. Other houses then were burned, belonging to people whom the crowd thought responsible for the war and the draft. Then, as the crowd grew larger and fiercer, it seized upon many negroes, cruelly beat them, and in many cases killed them, burning the bodies. For one night New York City was practically at the mercy of the mob. On Tuesday, July 15, thieves joined the mob, and matters became worse. Governor Seymour addressed them from the City Hall in a weak speech. Towards evening about 800 troops joined the weary police, and some headway was made. On Wednesday it was announced that the draft had been suspended in New York City and Brooklyn. The mob subsided. Militia at the same time arrived and began to rake the streets with cannon wherever occasion offered. By Friday all rioting was at an end. About 1,000 were killed, chiefly members of the mobs. The damage to property was about $1,500,000.

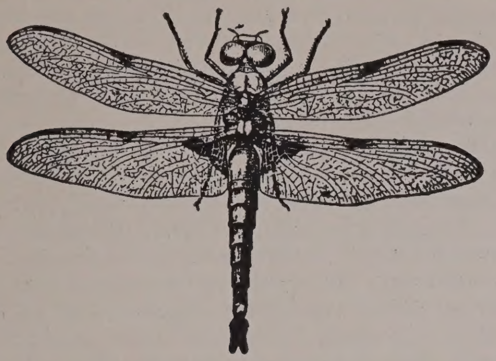
Drago Doctrine. A theory advanced in 1902 by Dr. Luis Drago, Argentine minister of public affairs, as an extension of the Monroe doctrine, to the effect that the debts of a nation should not be collected by its creditor-nation by force. It was modified in 1907 to the effect that the claims should be argued through the courts of the debtor country up to the Hague Tribunal, whose decision, if unfulfilled, may permit of such forcible measures. Dr. Drago published his theory at the time when England and Germany were trying to exact their dues from Venezuela. It was not received very favorably at first, but was finally submitted to the Hague Conference for approval and adoption.

Dragon, the name given to a lizard found in the East Indies, about seven or eight inches long. The skin along the sides of the body, between the legs, is spread out into a kind of parachute, and, these animals, which live among trees, may be seen shooting through the space from tree to tree, with the parachute expanded. They feed upon insects. Their color corresponds pretty well to that of the bark of the trees, but they have little or no power of changing color. In ancient and medieval times the dragon was a fabulous monster, either a serpent or a hideous winged and clawed creature, guarding some treasure or spreading havoc by occasional visits, and against which gods, heroes and knights combated.



DRAGON

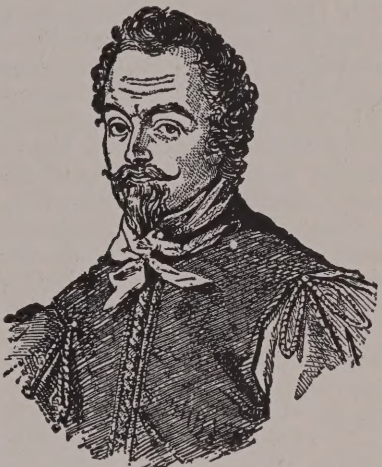
Dragon=Fly, the name of a group of insects, common all over the world, with four large transparent wings, that are net-veined. There are several varieties, and some have bright metallic colors. In the United States they are commonly called darning-needles, and are said by children to be able to sting, sew up the ears or do some other physical harm; but they have no sting and are entirely harmless to man. They have very large, rounded eyes, composed of several thousand elements united, and this gives a huge size to the head. Their mouth-parts are strong-biting jaws, and they devour many insects which they catch while on the wing. They are abundant about ponds and still waters, in which their eggs are laid. The larva lives in the water, feeding on insects and very small fish, which are caught by a peculiar claw. When ready to transform, the nymph crawls out of the water on the stem of a water-plant, its outer case splits open along the back, and the perfect insect issues from it.



DRAGON-FLY

Drainage, the means of escape for free water of the soil, which are (1) that afforded by the slope of the land, which may carry off much of the rainfall before it can sink into the ground, and (2) that given by underground facilities. On rather level land the excess water not absorbed by the soil itself tends to sink until it meets an impervious layer, and to spread on this until it escapes through some hillside as springs. If there is no such escape, the water remains as an underground lake saturating the soil to a level more or less below the surface. This level or water-table tends to rise according to the wetness of the season, and to fall with the dryness, or proportionably to the facilities for escape by artificial drainage. If the water-table is too near the surface, the air necessary for plant-roots is excluded from the soil. This tends to make roots, as, for instance, of grains, spread out in the upper layer of earth instead of striking deep. If the district is later subjected to drouth, the plant fails of its water-supply as the water-table descends below the layer of soil occupied by the roots. Artificial drainage is accomplished (1) by open ditches or (2) by covered drains. Shallow surface-drains, made by plowing, serve to carry off only surface-water. Dug ditches may also serve as outlets for covered drains. Covered or under drains are made by placing large stones, poles, brush or tiles at the bottom of a trench and covering with soil. They are made from 25 feet apart in heavy soils to 200 feet apart in light soils, and from three to four feet deep, the depth increasing with the distance between the drains. Tiles are made of clay, burnt like brick, are hollow and more or less cylindrical. They are more lasting than wood and more cheaply laid than stones, unless the latter are in the field and have to be gotten out of the way. The benefits of under-drainage are these: (1) By removing the free water to a lower level, the soil occupied by capillary water (see CAPILLARITY) is deeper, and more soil is available for plant roots. (2) Soil can more readily absorb rain-water and prevent surface-wash. (3) It aids ventilation of the soil, and so aids it in warming earlier in the spring and later in the fall. (4) It allows fertilizers to be carried into the soil instead of being washed off when the land has a slope. (5) It aids in various useful chemical changes. See King, *The Soil.*

Drainage-Canal. See CANALS.



SIR FRANCIS DRAKE

Drake, Sir Francis, a celebrated English sailor, was born in Devonshire, probably about 1540, though some authorities give the date of his birth as 1539. He was educated by his uncle, Sir John Hawkins, and was brought up to a sea-faring life. At 20 he made a voyage to Guinea, and two years later he was captain of the *Judith* in the expedition of Hawkins to Mexico. When he came back to England, he had gained a great reputation, but had lost all he had invested in the expedition. Soon after, he plundered many of the Spanish settlements in South America, and marched across the Isthmus of Panama, where, by climbing a high tree, he saw the waters of the Pacific. In 1577, under the favor of Queen Elizabeth, he set out with five vessels, intending to pass through the Straits of Magellan and explore the waters he had seen from the Isthmus of Panama. All but his own ship were separated from him by the time he had passed the straits, but he went forward alone, plundered the Spanish settlements in Chile and Peru, and claimed California in the name of his queen. He tried to find a northeast passage to the Atlantic, but was driven back by the cold. Instead of returning to England by the way he had come, he determined to make a circuit of the globe, and having crossed the Pacific and Indian Oceans and sailed around the Cape of Good Hope, he reached England in November, 1580, nearly three years after he had set out. Soon after his arrival, the queen paid him a visit, and ate dinner on board his ship, after which she made him a knight. Five years later, as war had broken out between England and Spain, Drake captured several Spanish towns in the West Indies, and two years later he entered the port of Cadiz in Spain, and destroyed a great amount of shipping, which was being prepared for the Spanish Armada, a feat which he afterward called "singeing the king of Spain's beard." When the Spanish Armada attacked England in the following year, Sir Francis Drake was appointed vice-admiral under Lord Howard, and did gallant service. Some years later, in company with Sir John Hawkins, Drake led an expedition against the Spanish settlements in the West Indies; but, as the commanders did not agree, the expedition was not successful. His lack of success was the main cause of Drake's death, which took place in the West Indies in 1596. See *Life* by Barrow.

Drake, Joseph Rodman, American poet, born in New York City in 1795. James Fenimore Cooper and Fitz-Greene Halleck were his most intimate friends. Drake's longest poem is *The Culprit Fay*, his most popular short poem being *The American Flag*. Drake and Halleck formed a partnership, and together wrote many witty poems to the New York *Evening Post*, under the signatures, Crooker, Crooker, Jr. and Crooker & Co. Most of Drake's poems were written before he was 21. He died of consumption in 1820, at 25.

Drake University. Drake University is situated in Des Moines, Iowa. Founded in 1881, its attendance has increased steadily from 270 in 1882 to 1,843 in 1910. The university includes the colleges of liberal arts, law, medicine and the Bible. The graduates of Drake University have proved its worth. It is co-educational, and provides special facilities for courses peculiarly adapted to young women. Its endowment is about $342,000, and its income about $125,000. The value of the buildings is given as $307,000 and of the grounds, which include a fine stadium, $100,000. A Carnegie library, costing $50,000, has recently been completed. The president is Dr. Hill McClelland Bell.

Dram'a, a term applied to compositions designed to be acted on the stage. Dramas which are intended to cause laughter and good humor are called comedies, and those which rouse the deeper emotions, having a sad or terrible ending, are termed tragedies. There also are many dramas which strictly are neither one nor the other, but combine both elements. The drama probably had its origin in the union of dancing and singing, for most early nations have had rude methods of imitating actions on the stage. The people of India, China and Japan each had a drama of its own, but it is with the ancient Greeks that our real interest in the drama begins. It arose in Greece in connection with the worship of the gods, by hymns and dances and rites of various sorts. Soon, instead of a single person reciting a hymn or a comic song, a chorus, accompanied by instrumental music, with the aid of gestures and dancing, was used to reply to the single actor; and later the actor, instead of reciting to the chorus, who replied in song, addressed the leader of the chorus, who carried on a dialogue with him, the chorus coming in with songs at proper intervals. The most famous of Greek dramatic writers were the four dramatists, Æschylus, Sophocles and Euripides, whose tragedies are among the finest the world has seen, and Aristophanes, the great comedy-writer. Nor must Menander the comedian be forgotten. The Roman drama was derived from the Greek, but was not nearly equal to it. Plautus and Terence were the most celebrated of its writers. Of modern European nations, nearly all have long made use of the drama. During the middle ages the Greeks of Constantinople preserved the drama, and introduced it into Sicily and Venice before the church-drama of western Europe had begun. In the 12th century it became common to introduce short performances at banquets, and about the same time mystery-plays, as they were called, became common; they were scenes from the Bible, acted by priests on a stage built in a church or church-environment. Later, the so-called morality-play became common. It consisted of a fable which was directed against vice in general. The nation deemed for a long time to have the best dramatic writers was France. Her great writers, Corneille and Racine, followed the models of the Greek dramatists very closely, and their dramas are among the best in any language. In the writing of comedies the French probably stand at the head of the great writers of the world. Molière, their greatest comedy-writer, is unapproached in his best pieces by any writer except Shakespeare. In Germany the theater was simply an imitation of that at Paris until the time of Lessing. He was a writer of great originality, and taught his countrymen to develop their own literature. He was followed by a number of dramatists of the first rank, among whom Goethe and Schiller were far the greatest, Goethe being now considered by many critics to be, after Shakespeare, the greatest dramatist the world has seen. Italy and Spain have had many excellent dramatic writers, the most celebrated in Italy being Alfieri, Manzoni and Goldoni, and in Spain, Lope de Vega and Calderon. England has had fewer great dramatists than France, but her greatest, Shakespeare, is unapproached by any writer of any country, and Molière alone is equal to him in the writing of comedies. Other great dramatists of Shakespeare's time were Ben Jonson, Marlowe, Green, Beaumont and Fletcher and, in later times, Dryden, Wycherly, Congreve, Vanbrugh, Sheridan, Goldsmith and Lytton. See *English Literature* by Henry Morley; *Lectures on the Literature of the Elizabethan Age* by William Hazlitt; and the authorities on the modern drama.

Draper, Andrew Sloan, an American educator, was born at Westford, N. Y., June 21, 1848, and graduated at Albany Academy and Albany Law School. He set out in life as a practicing lawyer, and in 1881 was a member of the New York state assembly and a judge of the United States court of Alabama claims. He then devoted himself to educational work, and successively filled the offices of member of the Albany school-board, superintendent of public instruction at New York and superintendent of schools at Cleveland, O. In 1894 he became regent and president of the University of Illinois, resigning in 1904 to become commissioner of education of the state of New York. He has written largely on educational topics, American schools and American citizenship; on the powers and obligations of teachers; and on the responsibility and authority of school trustees. Among his published writings are *The Organization and Administration of City-School Systems* (1888), *American Schools and American Citizenship* (1891), *Public School Pioneering in New York and Massachusetts* (1892), and *American Universities and the National Life.*

Draper, John William, an American chemist and physiologist as well as author, was born in 1811 near Liverpool, England. He came to America in 1833, and studied medicine in the University of Pennsylvania. After graduating he was appointed professor of chemistry and physiology in Hampton-Sydney College, Virginia. Some years later he accepted a like position in the University of the City of New York, and in 1841 was appointed professor in its medical college. He discovered many important facts of spectrum-analysis, and made important discoveries in photography. Besides his scientific writings, he found time to write valuable literary works, his *Intellectual Development of Europe* being translated into most European languages; the *History of the American Civil War* has also been widely translated. He died in 1882.

Drawing. "Drawing is the act of moving anything in one's own direction." If the thing moved be a point capable of leaving a record of its course, the result is the drawing of a line. Drawing in art is the indicating of directions by the making of lines, these lines generally forming the contours of spots and representing the profiles of forms.

In its strictest sense drawing applies to lines only: thus, *outline drawing* means the expressing of form or contour by lines alone. More broadly, the term drawing designates any representation more or less in outline, even including the use of tones of gray or color, particularly when such tones are produced by lines or are dependent upon the limiting influence of them: as, *pen-and-ink drawing*, in which the depth of the tones varies with the number or area of the ink-lines upon the white paper; *charcoal-drawing*, in which the depth of the tones varies as the weight of the lines employed; *pastel-drawing*, in which the colors are ordinarily applied with crayon, stump or finger. In the latter two forms of expression the lines may or may not disappear with the completion of the work. *Water-color drawing* is a term falling into disuse with the changing methods of employing water-color pigments. Water-colors were formerly used largely for tinting pictures in pen or pencil outline, and are now used more independently. (See PAINTING.) *Wash-drawing* is a term employed by modern illustrators to designate work in monochrome water-color done without the use of opaque white.

Among artists the word drawing may refer (1) to the indicating of form or contour either in pictorial or plastic art with reference to truth, beauty, technical perfection or all of these; as, "the splendid drawing of Michelangelo's *David*," meaning the beauty and perfection of the contours, or (2) to form or contour itself when viewed from the standpoint of the artist; as, "the drawing of the branches against the winter-sky" referring to the appearance of the actual branches against the sky. Great masters of this particular aspect of art-expression which we call *drawing* include Pheidias, Botticelli, Michelangelo, Andrea del Sarto, Raphael, Holbein, Ingres, Puvis de Chavannes, Hokusai, Menzel.

In educational phraseology the term drawing is often applied to all work in art, though it really designates only one factor in certain forms of art-expression. This somewhat inaccurate use of the term is due to the supposed commercial value which first won for this form of art-expression its place in school-courses, but in most localities the work has now outgrown both this estimate of its value and the methods of teaching that went with it. *Mechanical drawing*, the making of drawings with the aid of instruments and according to certain accepted conventions for the guidance of workmen and scientists, is properly an aspect of construction rather than of art. In many schools mechanical drawing is now taught in the construction department. *Working drawings* are mechanical drawings, made to scale and presenting a sufficient number of views of the given object to show all the facts of its form. *Freehand drawing* is a loose term covering generally all drawing that is not mechanical, even including in some localities water-color painting, design and certain forms of construction. This term shows the disciplinary rather than educational light in which art was at one time held as a school subject.

Courses in drawing. Since drawing concerns itself largely with contours and edges, mere drawing is rather an abstraction, and in the interests of the children would take its place after color, a child's interest in the *shape* or the color-spot coming with further development. Drawing for its own sake, or nicety of drawing, is a thing beyond his comprehension until he reaches the higher grades. To lead into more refined drawing through his awakening interest in the shapes of the color-spots he has occasion to employ, both in his design and in his representative work, would seem to be a true way of recognizing both his capabilities and his interests.

In the older art-schools it has been the practice to teach drawing by setting the student to work in charcoal or crayon from plaster casts of geometric or vegetable forms, or of fragments of the human figure, or even to have him begin by copying plates made from drawings of this kind, this work to lead ultimately to drawing from casts of the whole figure or of groups of figures, and thence to drawing and finally painting from the live model. The reverse order of work is now beginning to obtain, however, and in some modern art-schools students begin their study from the live figure in motion, and as knowledge of detail seems to become more necessary they turn to the cast, leaving the close study of the details of the figure to the last.

The educational content of drawing sums itself up about as follows: Drawing of itself may and probably will lead to an appreciation of beauty of line. It will also develop accuracy of vision. It demands a nice condition of muscular control, and it involves a complete acquaintance with the conventions of projection-perspective.

George William Eggers.

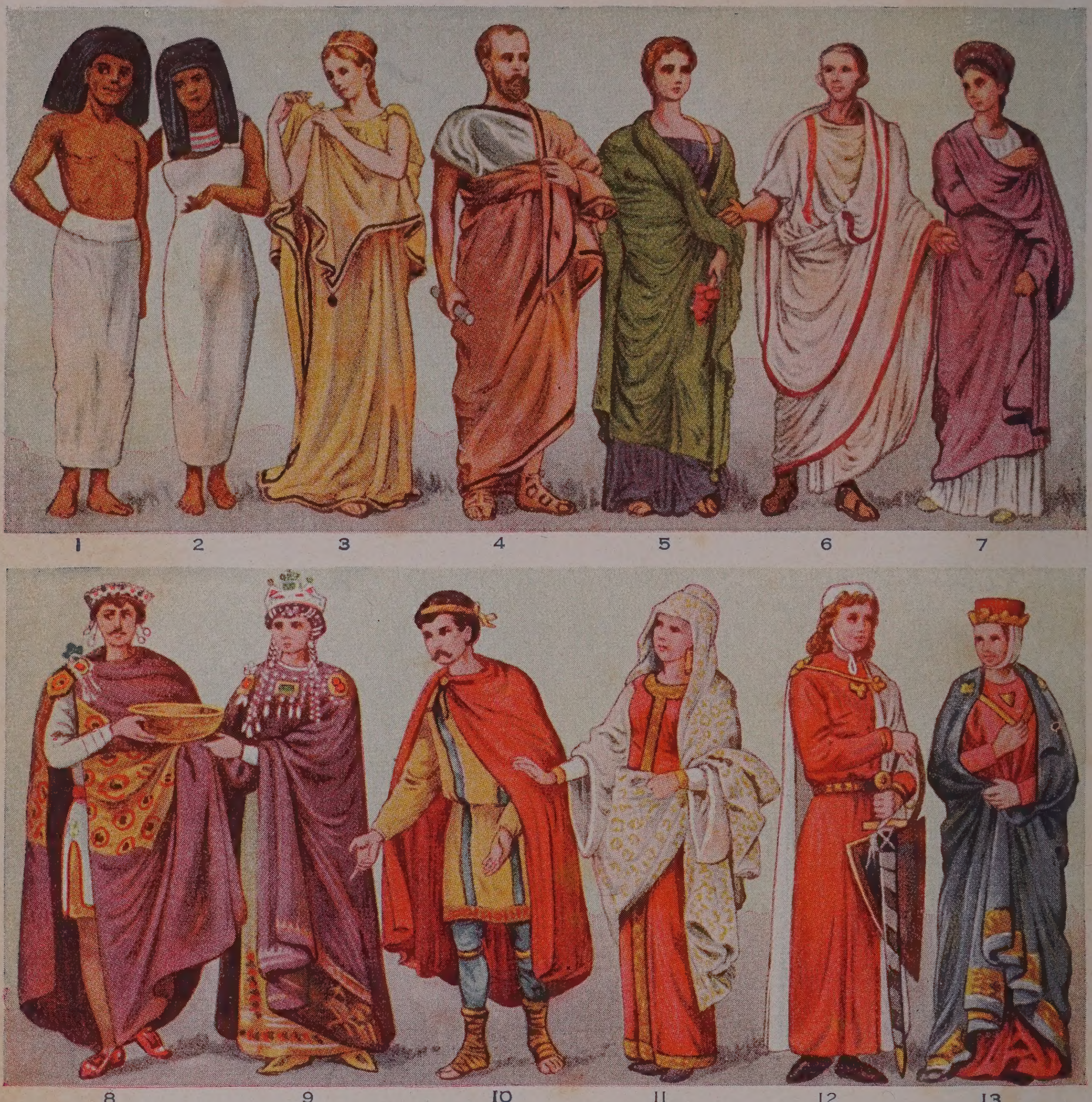
Dredging, the excavating or scooping out of soil, mud, sand or rock under water by a machine called a dredge. Dredging is used in deepening and widening the beds of rivers, canals, harbors. The forms of modern dredges are very numerous, different conditions requiring different forms. A common form is that in which a large number of buckets or scoops he is attached to an endless chain or a wheel. As the chain revolves, the buckets are filled and raised in succession and emptied at the top into a barge for that purpose. Another common form is the single scoop or dipper dredge, of the Osgood or other type. On a long arm, which can be let down and moved along the bed of the stream, is a scoop of suitable form, which can be thus filled, and when filled can be raised and emptied. Other machines include the clam-shell and oyster-dredge, the grapple and the suction-dredge, besides those used in deep-sea dredging. These latter collect samples of sea-bottoms, for the inspection of marine plants and animals. Another purpose of deep-sea dredging is to ascertain the nature of the ocean-floor, so as to determine its suitability for the laying of cables. Soundings for this and other purposes have been made, often at great depths, as in the explorations of the *Albatross,* of the U. S. Fish-Commission, which has made tests of the sea-bottom and brought up deep-sea life at depths varying from 4,000 to 5,000 fathoms. Modern dredges are operated by powerful steam-engines, and are strong enough to remove materials of any sort, even seventy-ton boulders. Hydraulic dredges perform an operation continuously. They have an enormous capacity and dispose of the material through discharge pipes. Dredging is also done by means of streams of water maintained in pipes by centrifugal pumps. The material to be removed is mixed with the water and carried along the pipes to the point where it is to be deposited in nearly level beds. This method is adopted for sand and soft mud, and has been extensively used in Holland and in San Francisco harbor, where the dredged material is used to fill low ground. Under special conditions pneumatic excavators have been used. In these the materials are drawn into pipes by the suction due to a vacuum. Such an excavator was used in the construction of the great Tay bridge, Scotland.

See Panama Canal; Suez Canal.

Dred Scott Case, a celebrated case involving a United States Supreme Court decision, in regard to the rights of slaves and slave-owners. Dred Scott, a negro born in Missouri about 1810, was taken to Illinois by his master, Dr. Emerson, and later to the territory of Iowa. At Fort Snelling, in free territory, Dred Scott married Harriet, slave to Dr. Emerson also, and two children were born to the couple. In 1838 Dr. Emerson returned to St. Louis, taking with him Dred Scott. A lawyer persuaded the negro to bring suit for assault and battery on grounds of coercion. The argument was advanced that residence in free territory had made Dred Scott a free man and a citizen of the United States. The defense contended that Dred Scott was a mere chattel, like a horse, incapable of appearing in court or being represented by a lawyer. The case went from one court to another. The Supreme Court decision on March 6, 1857, gave judgment against Dred Scott, with the practical result of establishing a precedent that an owner could take his slaves into any part of the United States and hold them.

As there was no contrary congressional action, this was the law of the United States until the thirteenth constitutional amendment on March 6, 1857, set it aside. Friends of Dred Scott purchased him and gave him his freedom, but the case aroused much excitement, and undoubtedly aided in precipitating the Civil War.

Dreibund, The, or Triple Alliance, was a league between the European powers of Germany, Austria and Italy, formed for the purpose of mutual protection, in the case of attack upon any of them by other nations. The league was formed in 1882, and was afterward renewed. Prior to 1882, however, a league, known as the Dual Alliance, had been in existence which was organized in 1879, between Germany and Austria. In 1882, Italy joined the Alliance, which was then called the *Driebund.* In the war of 1914, Italy refused to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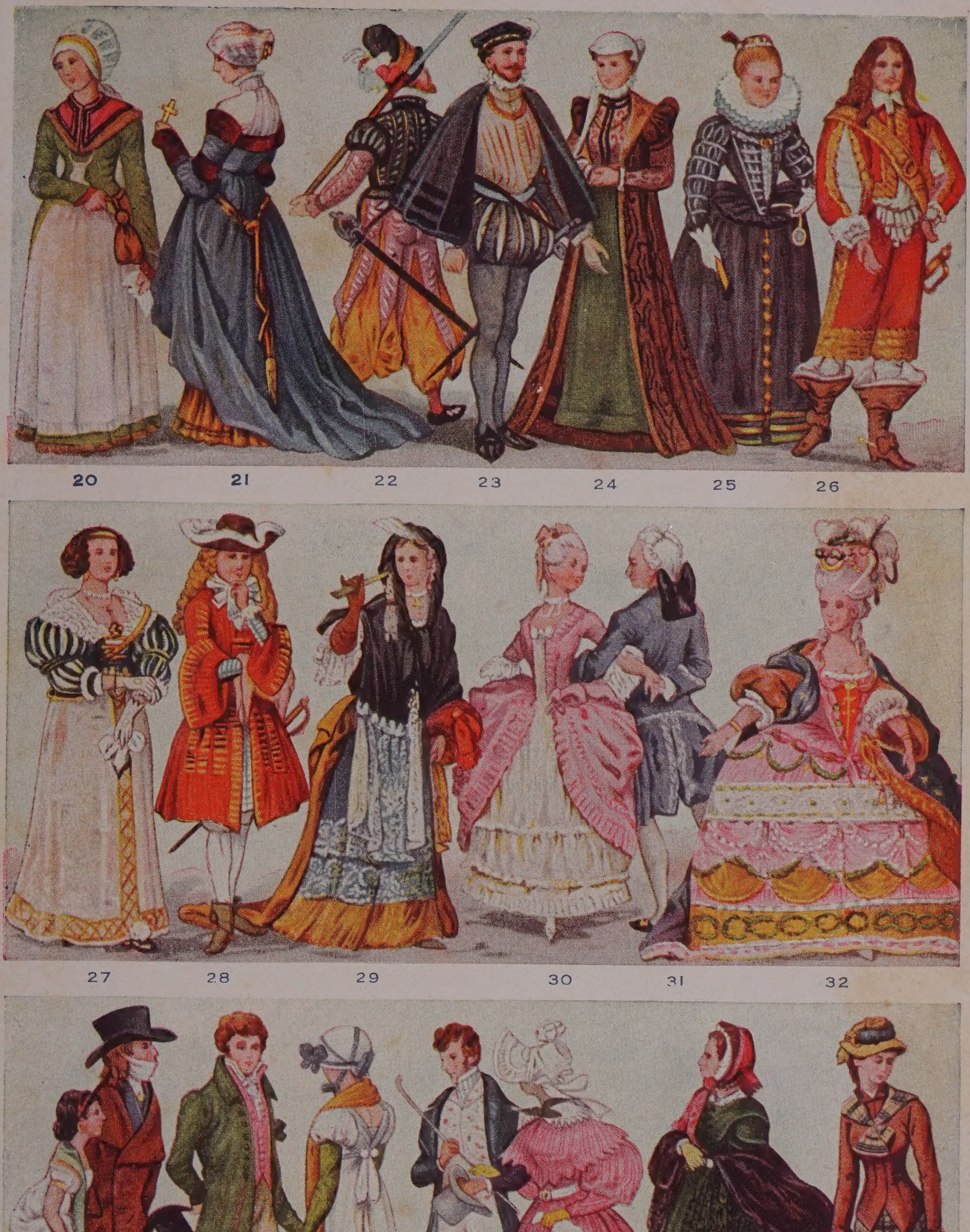
DRESS OF ANCIENT PERIOD (SEE DESCRIPTION FOLLOWING)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DRESS OF MIDDLE AND LATER PERIOD UP TO 1880 (SEE DESCRIPTION FOLLOWING)

Dress. Description of the dress of various peoples and periods as shown in the two preceding color plates.

1. *Egyptian Man.* Time—last period, or nearing the end of the old Dynasty. Costume—long skirt-like garment made of linen or cotton. Large curled wig.

2. *Egyptian Woman.* Time—same as No. 1. Skirt-like garment with shoulder-straps. Broad, highly colored shoulder-straps made of painted linen or small colored stones and pearls. Large curled wig.

3. *Ancient Greek Woman of Peplos.* Costume—merely a square linen cloth, one end of which is lapped over and fastened with pins at shoulders—not covering the whole body.

4. *Greek Man shown in "Chiton."* A short, sewed undergarment of part linen material over which the "Himation"—the woolen garment was thrown.

5. *Greek Woman during Hellenistic Period.* Costume—a long linen, usually colored, sewed undergarment with girdle and shoulder-straps over which the "Himation" was draped in similar manner as worn by the men.

6. *Noble Roman in Tunic.* A short garment trimmed with two stripes of purple (clavus) and worn by senators and like officials and the (toga praetexta) a purple-bordered robe draped as shown and worn by the highest officials.

7. *Roman Woman during the time of the Roman Empire.* Costume—similar to that worn by Greek women of late period. Long, usually white, sleeve garment (stola) over which when out of doors a colored robe was thrown. High, fancy coiffure.

8. *Byzantine Emperor.* Justinian. Costume—gold embroidered girdle, white undergarment with purple mantle trimmed with yellow squares (clavus)—to distinguish highest rank of nobility. Diadem of pearls. (Taken from Mosaic picture 2nd half of 6th Century in San Vitale in Ravenna.)

9. *Byzantine Empress.* Theodora, wife of Justinian. Costume—white robe with hem embroidered in gold and colored stones. Purple embroidered mantle. Diadem of pearls over which strands of pearls hang down to shoulders.

10. *Frankish Nobleman.* Costume—long-sleeved skirt-like coat—the Roman tunic with clavi. Tight leggings—ankles wound as was customary in Frankish period. (Taken from a miniature, ending of the 9th Century.)

11. *Frankish Lady.* Costume—richly embroidered robe with wide white sleeves. Scarf of costly material draped over the head and shoulders. Colored shoes. (Taken from a miniature ending of the 9th Century.)

12. *German Nobleman.* 13th Century. Long, girdled robe, mantle fastened with metal tassels. Head-dress of fine linen tied under chin. (Taken from statue in the Dom at Naumburg.)

13. *German Lady of Nobility.* 13th Century. Long, girdled dress—mantle fastened or trimmed with cord and tassels. Cap surrounded by diadem and fastened either on top or at temple with banding brought under chin and pinned to cap.

14. *Titled Young Lady.* (1400). Wide, decolleté, clinging dress with long wide sleeves having scalloped edge.

15. *Titled Young Man.* (1400). Costume—short, tight coat, with long wide sleeves having scalloped edge. Leggings and shoes of different color.

16. *Gentleman of Burgundy.* Costume—brocaded long coat, with padded sleeves (mahoitres). Pointed shoes (aumoniere.) Bag, dagger and belt. (Taken from a miniature in the last half of the 15th Century.)

17. *Gentleman of Burgundy.* Padded sleeves showing at neck the collar of the undergarment. Pointed shoes with extra outer soles. (Taken from a French miniature in the last half of the 15th Century.)

18. *Lady of Burgundy.* Blue underdress over which a trailing robe with border is draped. The robe being low cut at neck, allowing the red breast-band of (cotte) to show. Cornucopia-shaped hat with long veil draped from the back. (Taken from French miniature in last half of the 15th Century.)

19. *Nürnberg Citizen.* (1500). Costume—wide, gold-embroidery bordered velvet mantle.

20. *Nürnberg Woman.* (1500). In house-dress with cap apron and fichu over decolleté dress.

21. *Basel Woman.* (1525). In so-called Gretchen costume carrying on long hanging belt, her scissors, knife, etc.

22. *German Militiaman.* (1550). Costume—slit vest and long wide bloomers.

23. *German Gentleman.* (1575). In Spanish costume—padded short pants with slits showing bright colored padding. Padded vest and tights. Cape with small ruffed collar and small cap (toque) with cord and feather.

24. *Augsburger Patrician.* (1575). German costume under Spanish influence. Bell-shaped stiffened skirt. Small ruff around neck. Cape brocaded plush. Sleeves with small puff at top and apron.

25. *French Lady or Madame.* (1600). In Spanish costume—stiff hoop-skirt drawn tight at waist-line with stiffened frill at

waist. Padded sleeves. Large ruff collar. (Taken from French Miniature.)

26. *German Gentleman.* (1650). A sample of the costume worn by wealthy Germans at the end of the 30-years War. Short vest with wide linen collar. The open sleeves and short vest allow the white skirt to be visible. High boots, the wide tops of which are trimmed with lace. Long hair, or sometimes wig.

27. *German Lady.* (1650). Costume worn at the end of the 30-years War. Short-waisted effect with wide puffed sleeves. Wide costly lace collar. Shoes adorned with rosettes. (Taken from French Miniature.)

28. *Aristocratic Gentleman.* (1700). Costume—tight gold-trimmed over-coat, three-cornered hat with feather trimming. Lace ruff, muff, half-boots with red heels. Blonde wig.

29. *Aristocratic Lady.* (1700). Street-costume. Blue under-garment with silver embroidery and gold fringe. Trailing over-skirt, turned back lace cap. Muff with bow of colored ribbon. Cape with lace decorations.

30-31. *French Fashions of 1760.* Lady in short hoop-skirt with over-garment puffed at waist, on sides and at back. Hair powdered. Gentleman — with smail powdered wig.

32. *Marie Antoinette.* Court costume. (1780). Very full hoop-skirt flat in front and back, padded at hips, richly embroidered. High, powdered coiffure, adorned with pearls, flowers and feathers.

33-34. *French Couple.* At time of Directorate. (1795). Lady in latest style showing departure of hoop-skirt and laced waist. Shoes without heels.

35-36. *Lady and Gentleman.* At time of the First Empire. (Taken from Fashion Journal in 1807).

37-38. *Lady and Gentleman.* At time of the "Biedermeier."

39. *Lady in Crinoline.* At time of the Second Empire. (1858). (Taken from Fashion Journal.)

40. *Fashion in 1880.* Tight skirt.

join her Allies, claiming neither had been attacked.

See World War.

Dreiser, Theodore, an American editor and author, was born in Terre Haute, Indiana, on August 27, 1871. He was the son of John Paul and Sarah (Schanab) Dreiser, pious Catholics of German descent. His father owned a small woolen mill, and Theodore lived in a pretty, comfortable home until the mill burned, leaving the family penniless. The next years were difficult. Finally, the family went to live with Theodore's older brother, the Paul Dreiser familiar on Broadway as the author of *The Banks of the Wabash,* and other popular songs, and sympathetically portrayed by Theodore later in *Twelve Men.* Theodore's father was an extreme religionist. His mother possessed a poetic soul and a happy, optimistic temperament. The youth of the future author was singularly uneventful, lacking in fun. He began reading widely when but a boy, and traces his spiritual regeneration to his intellectual progress through Spenser and Huxley against materialism.

Theodore Dreiser was educated in the public schools of Warsaw, Indiana. At the age of sixteen he journeyed to Chicago and found work in a hardware company. Two years later he entered Indiana University, but was financially unable to continue his studies there after a year. He returned to Chicago and became a clerk in a real estate office. His heart was bent upon newspaper work and daily he haunted newspaper offices. On June 15, 1892, he succeeded in obtaining a position with the Chicago Globe. By 1899 he had built himself a record of successful newspaper work, chiefly as dramatic critic and travelling correspondent in Chicago, St. Louis, Toledo, Cleveland, Buffalo, Pittsburgh, and New York. In 1898 he had married Sarah Osborne White of St. Louis, Missouri, but the marriage was not a success. Three years previously he had begun special work for such magazines as Harper's, McClure's, Century, Cosmopolitan, and Munsey's. In 1898 he sold his first story which was accepted by Ainslee's Magazine. His first novel, *Sister Carrie,* was published in 1900. This book created a sensation. It was suppressed because of its moral content, and the severe criticism to which the work was subjected reacted painfully on Dreiser. The author was actually a dreamy, vague, poetic soul, buffeted by reality, easily and deeply hurt. For the next five years he made a meagre living from short stories, articles, poems, Sunday newspaper tales, reporting, editing and rewriting until he secured his post with Smith's. In 1905 he became managing editor of the *Broadway Magazine.* He was editor-in-chief of the Butterick Publications from 1907 to 1910. In the latter year, after his successful editorial experience, he secured a proprietary interest in the *Bohemian Magazine.* This venture soon failed, however, and with it went all of Dreiser's savings.

In 1911 Harper's accepted *Jennie Gerhardt,* and Dreiser's future was secure. From that time on he wrote and published constantly, chiefly novels, a number of short stories, some poems and essays, and a three-act play.

Dreiser may be said to have faithfully mirrored the national soul of America in the first phases of industrialism. As a romantic naturalist, he saw the epic quality in the rise of individuals to merciless power through their adaptation to the peculiarly American conditions of living. He felt the underlying human tragedy in the necessary rise of rapacious strength through exploitation of the masses. He labored under a typically American combination of materialism and sentimentality, and a profound belief in the æsthetic perfection of life. His work is characterized by a simplicity in characterization, careful attention to detail, the permeation of emotion, and an outstanding pity. "Life is seeking without a finding," is exemplified in his writings. Among his many works are *The Genius* (1915), which was suppressed in 1916; *A Hoosier Holiday* (1916); *Hey Rub-a-Dub-Dub* (1920); *A Book about Myself* (1922); *An American Tragedy* (1925); *Dreiser Looks at Russia* (1928); *A Gallery of Women* (1929), and *Tragic America* (1932).

Dresden (*drĕz'dĕn*), an important German city and the capital of the Free State of Saxony, is situated in the beautiful valley of the Elbe, about 100 miles south of Berlin. The city lies on both sides of the river which is crossed by five bridges. The older portion of the city, the Alstadt and Friedrichstadt and eight suburbs, which lies on the left bank of the Elbe, has narrow, gloomy streets. The streets of the newer section, the Neustadt and Antonstadt and suburbs, are wide and regular. There are numerous squares and parks in both sections. Dresden's largest park is the Grosse Garten, situated just southeast of Alstadt. Here there are many fine old statues, a museum of antiquities and a zoological and botanical garden. Alstadt also has several interesting squares, the most famous of which are the Altmarkt, the Neumarkt, the Theatre-Platz, and the Schloss-Platz. On the right bank of the Elbe, the most noteworthy squares of the Neustadt are the Albert, the Kaiser Wilhelm, and the Alaun. Along the left bank of the river stretches for a mile and a half the most beautiful promenade of the city, the Brühl Terrace. It is handsomely decorated with a staircase adorned with gilded statuary.

Dresden is often called the Florence of Germany, because of its many objects of high historic value. Many of its churches are of historic interest. In the Neumarkt stands the church of Our Lady which dates from the beginning of the eighteenth century. The lantern of the edifice measures 311 feet. The church is noted for its fine baroque altar. From the Augustus Bridge one can see the tower of the Roman Catholic Court Church upon which construction was begun in 1739. The façade of the church is adorned with fifty-nine statues of saints wrought by Mattielli. The Protestant Sophienkirche, with its twin spires, is one of Dresden's most outstanding structures. It was constructed in 1351-57, and was restored in 1864.

Dresden is famous for its artistic, literary, and scientific collections, many of which are housed in historic palaces. The most prominent of secular buildings is the royal palace which was built by Duke George in 1530, and greatly enlarged by Augustus the Strong. The palace was restored and partially rebuilt in 1890-1902. One of the most magnificent palaces ever constructed is the Zwinger which was begun in 1711, during the reign of Augustus the Strong, but never completed. It abounds in sculptures, especially statues of Michelangelo, Giotto, Holbein, Durer, and Goethe. The northeast wing of the palace is now a museum. The Dresden Picture Gallery, for which the city is famous, is located in the Museum of Zwinger. More than 2,500 canvases are on exhibition here. The works of many Italian and Dutch masters hang here, including those of Raphael, Andrea del Sarto, Titian, Palma Vecchio, Tintoretto, and Ribera. Among the Spanish artists are the paintings of Velasquez and Murillo. The Flemish school is represented by Rubens, Van Dyck, Jordaens and Teniers the Elder. Works of the Dutch masters, Rembrandt, Frans Hals, Ruysdael, and Van der Meer also hang here. There are many modern artists represented here also. There are also more than 350,000 woodcuts and copper engravings in the Museum.

One of the most complete and interesting museums in the whole of Germany is the Museum Johanneum. Here are collected both ancient and modern arms, implements and costumes.

Among Dresden's other imposing buildings are the Japanese Palace, which dates from 1715, and which now houses the Royal Library of more than 300,000 volumes; the Royal Music School, and the Court Theatre which is devoted to opera and outstanding dramas.

Dresden is an important manufacturing and commercial city as well as a storehouse of art. Its most important manufactures include machinery, pianos, gold and silverware, paper, cigarets, chocolate, pottery, porcelain, photographic apparatus, and tinware. The publishing of books and objets d'art is extensively engaged in by the inhabitants. Dresden is one of the most important ports on the Elbe. It is the seat of three shipping companies. It has a well equipped airport and seven railways which offer excellent communication facilities with Europe.

The city is under the administration of a chief burgomaster, two burgomasters, thirty-six aldermen, and a council of eighty-four city representatives. It is the seat of consular representatives from several foreign countries, including the United States. The climate is subject to frequent and sudden changes.

Dresden is known to have existed in 1206. It was almost entirely burned in 1491, but was soon rebuilt. In the first half of the eighteenth century, Augustus I and II, Electors of Saxony, by their extensive improvements, began to improve the general appearance of the city, until it became one of the finest cities in Europe. The city suffered severely in the Seven Years' War, in the wars of Napoleon and in the Revolution of 1848. In 1813 Napoleon converted the city into a great arsenal, and it was here, on German soil, that he won his last victory. The fortifications were abolished in 1817 to make way for Dresden's spacious promenades. In 1866 the Prussians seized Dresden and held it for one year. It was incorporated in the German Empire in 1871. Upon the formation of the Republic of Saxony on November 9, 1918, Dresden became the capital of that Free State. The population is 625,016.

Dreyfus (*drā-füs'*), **Alfred,** a French artillery officer, was born at Mülhausen, Alsace, the son of wealthy Jewish parents. He was educated at the École Polytechnique and the École d'Application. In 1889 he became captain in the Twenty-first Regiment of artillery. In 1891 he entered the École de Guerre and was one of the leaders of his class. Shortly after leaving this institution he received an appointment on the general staff. Partly because of racial prejudice he became a victim of conspiracy. In 1893 he was court-martialed, tried in secret court, deprived of his rank and sentenced to solitary confinement on the Ile du Diable situated off Cayenne. The charges against Dreyfus were those of selling information to the German government. He was persistent in his denial of any guilt and was defended by Émile Zolà and Georges Clemenceau. The evidence which had been presented against Dreyfus consisted in a memorandum or *bordereau* which apparently contained the captain's handwriting. A few years later the Court of Cassation, the highest tribunal in France, ordered a new trial by court-martial. The court-martial sat at Rennes and although Dreyfus was again declared guilty, his sentence was changed to ten years' imprisonment. The prisoner was pardoned by President Loubet in 1899. Dreyfus immediately set about clearing his name. In 1903 the Court of Cassation, without ordering a new trial, established the innocence of Dreyfus and restored him to his rank of captain in the army. The Chambers, the following day, promoted Captain Dreyfus to the rank of major. In 1919 Lieutenant-Colonel Dreyfus was decorated with the Cross of the *Legion d'Honneur*.

The Dreyfus Affair was one of the most famous political events of the nineteenth century. The final outcome was a great victory over the corrupt militarism which dominated France.

Dreyse, von (*fōn drī'zĕ*), **Johann Nikolaus,** a German mechanician and inventor of the needle-gun, was born in Prussia in 1787. He was a locksmith in his youth, but later worked in a gun-factory in Paris. He later established an ironware factory in Sömmerda. There he manufactured percussion-caps under a patent in 1824. He spent most of his time in making improvements in firearms. In 1827 he perfected a muzzle-loading, and in 1836 a breach-loading needle-gun. The latter was introduced in the Prussian army in 1840. The following year he opened a gun-factory which soon supplied weapons for all the German states. Dreyse was ennobled in 1864. He died in 1867.

Drift, or glacial drift is the name given to the deposits made by the ice of the glacial period and by the waters which arose from the melting of the ice. The drift consists of bowlders, cobbles, pebbles, sand and clay, often mingled without trace of arrangement. The bowlders are often two or three feet in diameter, and occasionally ten to twenty or even thirty feet or more. They are sometimes known as hard heads or, when black, as niggerheads. They may be composed of any sort of rock over which the ice came. The stones of the drift are often striated. The clay of the drift is really rock-flour, being composed of the comminuted products of rock. The drift deposited by the ice directly is often called till or bowlder-clay. It is not stratified. The drift deposited by the water to which the melting of the ice gave rise is stratified. It consists of gravel, sand or clay.

Drift covers most of the United States north of a line drawn along the south coast of New England, through Long Island, northern New Jersey and Pennsylvania, southern Ohio, Indiana and Illinois and thence along the general course of the Missouri. Drift also covers most of British America, and there are local areas of drift in the western mountains south of the above line. There is a small area of 8,000 or 9,000 square miles, in southwestern Wisconsin and the adjacent corners of Illinois, Iowa and Minnesota, where drift is absent. This area is known as the driftless area.

The sources whence the materials of the drift came are often determinable. Thus, masses of native copper, which could only have come from the Lake Superior region, have been found in Illinois and Indiana. They show that the ice which made the drift of this region moved in a southerly direction. Bowlders from the Palisade ridge above New York are found on Staten Island and on the west end of Long Island, as well as in New York city, showing that the ice here moved to the southeast. The drift is in places as much as 500 feet thick, although its average thickness in the United States is probably not more than half the latter figure.

Drift also covers much of northern and northwestern Europe, reaching south to southern England, the mountains of Germany and to still lower latitudes in the western and central parts of Russia.

Drinkwater, John, an English poet, and critic, was born at Leytonstone, Essex, in 1882. He was educated at the Oxford High School, where he acquired an enthusiasm for sports. He played cricket and football, and made a record for the junior long jump. He became an insurance clerk for twelve years. His interests lay in the field of literature, however, and he was eager for the life of the theatre, also. He became manager and producer to the Pilgrim Players, which later developed into the Birmingham Reportory Company. His first book of poems, entitled simply *Poems,* had appeared in 1903, followed by *The Death of Leander* in 1906. He divided his free time between writing poetry and his theatrical interests. His first play, *Cophetua,* was produced by the Pilgrim Players. In 1913 the Reportory Theatre was built, and Mr. Drinkwater's company had a permanent home. He then became manager of the Theatre. In 1918 his play *Abraham Lincoln* was produced there, and John Drinkwater found himself famous overnight, for this remarkably dramatic and sympathetic treatment of an American hero. Among other plays are his *Loyalties* (1919); *Mary Stuart* (1921); *Oliver Cromwell* (1921); *Robert E. Lee,* and *Bird-in-Hand* (1928). His *Collected Plays* were published in 1925, and *The Gentle Art of Theatre Going* in 1927. In 1923 appeared his *Collected Poems.* Mr. Drinkwater has written much criticism, and published anthologies of poetry, which include the popular *Twentieth Century Poetry,* with Henry Seidel Canby, in 1929. His prose writings of a criticial and biographical nature include *Mr. Charles, King of England* (1926); *Charles James Fox* (1928); *Pepys: His Life and Character* (1930) and *The Life of Carl Laemmle* (1931).

Dromedary. See CAMEL.

Drowning, accidental asphyxia, the remedy for which is the instant resort to artificial respiration and circulation, by supplying fresh air to the lungs and forcing the blood from the engorged right side of the heart. In cases of accidental drowning, where the victims have for some time been submerged, it is well to know what to do to recover them from the sea and how to proceed in the way of resuscitation. In reaching a drowning person, the first precaution on the part of the rescuer is to take care how to approach the victim in the water, after divesting oneself as speedily as possible of all impeding clothing. The general rules to be followed are as follows: In attempts to rescue, if the victim has sunk, the first thing to note is the spot where the body has gone down. If the water be smooth, this will generally be made plain by the air-bubbles which will occasionally rise to the surface, allowance being of course made for the motion of the water if in a tideway or stream, which will carry the bubbles out of the perpendicular course in rising to the surface. If the victim has not sunk but is still struggling on the surface, an assuring hail that help is near should be given; although in approach to him care should be taken that the one in peril does not seize or otherwise place at a disadvantage his would-be rescuer. It will often be better to hold off until the victim has lost consciousness or even sunk. When the rescuer has got close to the drowning one, or recovered him if he has sunk, take fast hold of the hair of his head, turn him as quickly as possible on his back, at the same time giving him a sharp pull which will cause him to float, then throw yourself on your back also, and either swim for the shore or towards some boat which may put off to the double rescue. Rescues are frequently made by floating idly, until other help comes, and often by paddling with the feet merely, so as to keep the head above water. On rescuing a person by diving to the bottom, the hair of the head should be seized by one hand only, and the other used in conjunction with the feet in raising yourself and the drowning person to the surface. If in the sea, with an outsetting tide, it will be found best to keep both yourself and the drowning one afloat merely, until other help arrives.

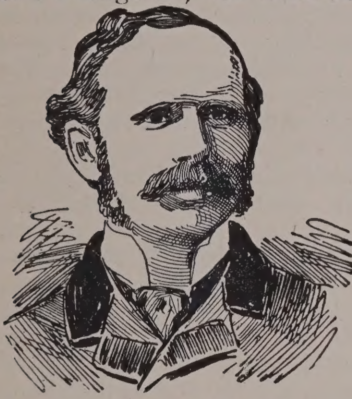
Treatment when the body is brought ashore. Summon a physician, then expose the patient to a current of fresh air, wipe dry the mouth and nostrils, rip the clothing so as to expose the chest and waist, and give two or three quick smarting slaps on the stomach and chest with the open hand. If the patient does not revive, try to drain the water from stomach and chest by turning the body face downwards; place a bundle of lightly rolled clothing beneath the stomach, and press heavily over it for half a minute or so long as fluids flow freely from the mouth. Before this, if the jaws are clinched, it will of course be necessary to separate them; to keep the mouth open, force a cork or small piece of wood between the teeth, clearing the mouth and throat of mucus now and then by wrapping a handkerchief round the finger and introducing it into the throat. Especially keep the pit of the stomach, as the patient lies on his face, above the level of any other portion of the body. If other aid be present, let it be utilized by giving an assistant a dry cloth or handkerchief to grip and hold the tip of the patient's tongue, so as to prevent its pulling back and obstructing the wind-pipe; and with the other hand let him grasp both wrists and keep the arms forcibly stretched back above the head, thereby increasing the prominence of the ribs, which tends to enlarge the heart. Meanwhile, actively dry and rub the body, taking care at the same time not to interfere with the means to which resort is had to produce breathing. The limbs should also be well-rubbed, and in an upward direction towards the body, with firm grasping pressure and energy, using preferably the bare hands or dry, warm flannels, which should also cover the body to restore its heat. Bottles of hot water, or heated bricks or stones, should moreover be applied to the limbs and soles of the feet. As soon as breathing is reëstablished, the patient should be stripped of all wet clothing and wrapped in blankets, or put to bed, comfortably warm, but with a free circulation of fresh air. A little brandy and hot water, or other stimulant, should be given the patient every 10 or 15 minutes for the first hour, and as often thereafter as may be deemed expedient; a mustard plaster over the breast is often prescribed, where there is danger of congestion of the lungs; but in most cases it is essential to refrain from effusive fussing and to let the patient rest, especially if watched over by a physician or by an experienced professional nurse.

Dru'ids were the priests of the early Gauls and Britons. How their religion arose or where they got it is unknown. Cæsar has described them more fully than any other writer. They seem to have believed in God and in a future life. Their temples were circles of uncovered stone, open to the heavens. Fire was worshiped, and human beings, especially prisoners and criminals, were often sacrificed. The oak and the mistletoe were held sacred; and whenever mistletoe was found twining round an oak, a festival was held around the tree and a sacrifice was made. The Druids were of three orders — bards, prophets and priests. They had many privileges and possessed much power over the people. They were the teachers of the youth, and seem to have had considerable knowledge on many subjects They settled all disputes between the tribes, and thus were judges also. Their power gradually ceased after the Romans conquered Gaul. For some time after being driven out of Gaul and Britain, their religion lingered in the little island of Anglesea, but was finally driven out by the Romans. Immense stone ruins, supposed to be those of their temples, are still found in Great Britain and in western France. There also were druidesses of different ranks, but little is known of the druids' doctrines. See *Celtic Heathendom* by Professor Rhys.

Drum, a musical instrument supposed to have been brought to Europe by the Moors or soon after the crusades, though the Greeks and Romans seem to have had a kind of kettle-drum. The instrument called a timbrel in the Bible was probably a kind of tambourine, beaten with the fingers. In India a species of drum, called the tomtom, was used in early times, and a like drum existed in Egypt as early as 1600 B. C. Among savages the drum is the chief musical instrument. In the modern orchestra three varieties of drums are used: the ordinary side-drum, the bass-drum and the kettle-drum. The side-drum is a cylinder of thin wood or brass, covered at both ends with parchment, which can be loosened or tightened by strings. It is worn at the side, whence its name; and is beaten on the upper end with sticks. The bass-drum is an instrument of the same kind, but much larger, and is beaten on both ends with sticks having leather-pads. These two drums are used specially in military bands, but also in orchestra. The kettle-drum is a hollow brass or copper basin, covered with parchment and fastened by an iron ring.

Drum’mond, Hon. Sir George, was born in 1829, in Edinburgh, Scotland, and educated at Edinburgh University. He came to Montreal in 1854 to assume the management of a sugar-refinery and in 1879 founded the Canada Sugar-Refining Company. He also founded the Home for Incurables. For many years officially connected with the Bank of Montreal, he now is its president. He was appointed a senator of Canada in 1880.

Drum’mond, Henry, a Scottish author and evangelist, was born at Stirling in 1851. He was educated at Edinburgh University and also at Tübingen, in Germany. In 1877 he became professor of natural science in the Free Church College of Glasgow. He visited America soon after, on a geological expedition to the Rocky Mountains and the Yellowstone Park. He also explored in Africa, in search of unknown animals and insects. In 1877-78 he contributed articles on religious subjects to a magazine. These essays created a wide interest, and with others were made the foundation of *Natural Law in the Spiritual World*, which had the world for its reader. He followed that work with *The Ascent of Man* and with *The Greatest Thing in the World.* He also actively engaged in the religious work that has been carried on in the colleges of England and Scotland, and to him is largely due the change in the whole atmosphere of college-life in all great universities. He died in England, March 11, 1897. See *Life* by Prof. George Adam Smith.



HENRY DRUMMOND

Drum’mond, William Henry, born in Leitrim, Ireland, in 1854. He is professor of medical jurisprudence in Bishops College, and has achieved reputation as a writer of dialect-verse. Some of his poems appear in all standard collections of humorous poetry. The *Wreck of the Julie Plante* and *Johnny Courteau* are well-known.

Drum’mond Light, a very intense white light, produced by allowing an oxyhydrogen flame to play upon a piece of lime. This light is used very largely in projection-lanterns, and for this purpose stands second only to the electric arc. It is now generally called the oxyhydrogen light, although in practice the flame is generally produced by the combustion of coal-gas (not hydrogen) in oxygen. This light was devised in 1825 by Captain Drummond, a Scotch engineer (born 1797, died 1840). The invention was suggested by a remark which he heard in a lecture at the Royal Institution, where the speaker commented upon the brilliancy of incandescent lime. The light was originally intended for illuminating distant stations in the work of the geodetic survey.

Drummondville. A village on the Canadian side of the frontier, overlooking Niagara Falls. Called after General Drummond who was in command of the western army in the War of 1812. Lundy’s Lane, a famous thoroughfare is a feature of the village. Nearby was fought one of the most important battles of the war. Now a part of the Canadian city of Niagara Falls.

Drupe, a stone-fruit, as the peach. See FRUIT.

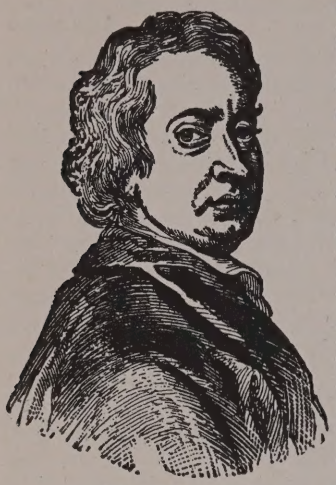
Drupelet, a diminutive drupe, such as are aggregated in a blackberry or raspberry.

Druses (*druz’es*), a people and sect of Syria, remarkable for the success with which they have defended their independence against Turkey. They are distinguished because of their peculiar religion. Their total number is between 50,000 and 100,000, and they are chiefly occupied in producing and manufacturing silk. Their religion is an offshoot from Mohammedanism, though in some points it is much nearer to Christianity. The Druses are noted for their hospitality to strangers, and are very industrious. A bloody war between the Druses and the Maronite sect of Christians took place during the 19th century. It was stopped by the interference of European nations in 1860. See *The Druses of Mount Lebanon* by the Earl of Carnarvon; also *The Land of Gilead* and *Haifa* by Laurence Oliphant.

Dry’ads (*drī’ads*), in Greek mythology, were nymphs or goddesses of trees and woods, each tree or wood being supposed to be the home of its particular dryad.

Dry’den, John, a celebrated English poet, was born in Northamptonshire in 1631. He was educated at Cambridge University. His first work to attract attention was *Heroic Stanzas on the Death of Cromwell.* Soon after he wrote *Astrea Redux*, a poem hailing the restoration of Charles II. He next turned to the writing of plays for the stage; but most of his plays are immoral, and all are the poorest of his works. In 1666 he wrote a poem called *Annus Mirabilis* or *The Wonderful Year.*

His most famous poems are satires on other writers or discussions with them. His *Absalom and Achitophel*, published in 1681, has been called the most powerful political and personal satire in English verse. It really is a political pamphlet against prominent men of the time, and full of bitter and biting sarcasm. Another of his best known poems is *Religio Laici*, a theological discussion in rhyme; his *Hind and Panther* is a satirical allegory in defense of the Roman Catholic church, to which he became a convert under James II. *Mac Flecknoe* is another bitter satire, against Shadwell, a literary rival. He died at London, May 1, 1700. See *Dryden* in the English Men of Letters Series; *Lives of the English Poets* by Dr. Johnson; and *Among My Books* by James Russell Lowell.


JOHN DRYDEN

Dry Tortugas, a group of ten islets forming part of Florida, at the end of the Florida keys. They are of coral formation and are low and barren, except where covered with low bushes. On one of them are Fort Jefferson and a lighthouse. During the Civil War the fort was used to imprison Confederate prisoners, and several men concerned in the conspiracy to assassinate Lincoln were confined there.

Dual Alliance. See EUROPEAN WAR p. 160.

Dub'lin, the capital of Ireland, is situated on the River Liffey, at its entrance to Dublin Bay. The river cuts the city into two parts, which are joined by seven stone-bridges and two iron ones, and at its mouth are a good harbor and extensive docks and wharves. The trade is largely in timber, wine, cattle and agricultural produce. The Bank of Ireland, the custom-house, Trinity College, Dublin Castle, Christ Church, and St. Patrick's cathedral are among the finest buildings in the city. The cathedral of St. Patrick was founded in 1190 by John Comyn, archbishop of Dublin. One of the finest monuments in the city is that to Lord Nelson, which is 134 feet high. Those to O'Connell, Grattan and Burke are also noticeable. Trinity College is the most prominent university in Ireland. It was founded in 1591 by Queen Elizabeth, and to-day has a teaching staff of 54 professors, with an attendance of 1,100 students. It has special departments for the study of medicine, theology and engineering, besides the department of arts and sciences. Its library contains 190,000 volumes. The university sends two members to the house of commons. Phœnix Park, which contains about 2,000 acres, has beautiful scenery, and helps to make Dublin one of the most beautiful capitals of Europe. The Danes captured the city in the 9th century. Under Henry II the English took possession of the city. It was burned in 1190, and three later conflagrations have destroyed portions of the city. During the protectorate of Richard Cromwell the city was seized by the Royalist party, and in 1861 James II held a parliament there. In 1800 the act of union between Great Britain and Ireland was passed, and the flag of the United Kingdom was hoisted on Dublin Castle Population, 309,272.

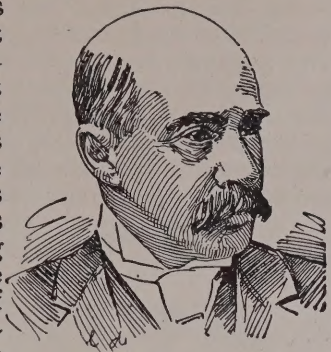
Dubois, William Edward Burghardt, an American educator of negro blood, was born in Massachusetts in 1868, and attended Fisk, Harvard and Berlin Universities. He is editor of the Atlanta University series of publications, and professor in Atlanta University. Professor Dubois is the author of several books upon the negro question, including *The Negro Artisan* (1903) and *The Relation of the Negro to the Whites in the South* (1901).

Du Bois, (*du-bois'*), **Pa.,** a borough in Clearfield County, about 80 miles from Pittsburg. It is located in a coal-region, but besides its mining-interests it manufactures mining implements, has flour and lumber-mills, an iron-works and extensive car-shops. DuBois has the service of three railroads. Population, 14,000.

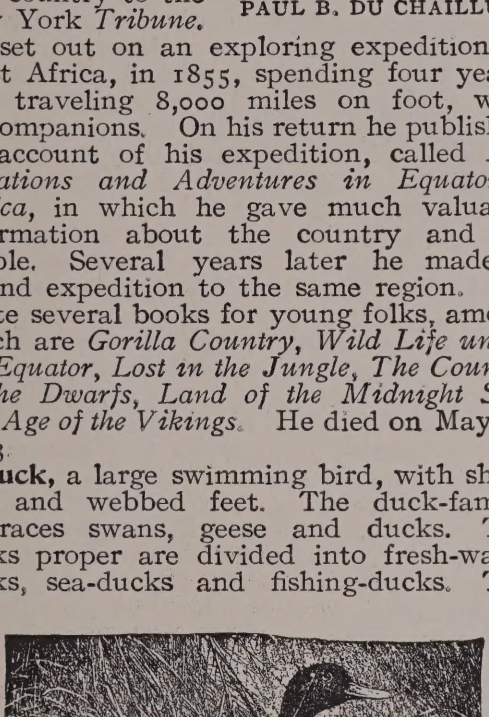
Dubuque, Iowa, is a hilly city called "the Heidelberg of America" because of its beauty. It is the county-seat of Dubuque County and is on the west bank of the Mississippi. It is a railroad center and has sash and door factories, railroad shops, cabinet, carriage, machinery, flour and soap works, as well as extensive lumber and pork-packing interests. It is the chief depot for the lead region of northeastern Iowa. There are many fine buildings in the city, and among its educational institutions are a Presbyterian College, a Catholic College, and five Catholic seminaries. At this point three iron bridges span the Mississippi. The city is the oldest permanent settlement in Iowa. In 1893 it was created the see for an archdiocese of the Roman Catholic church. Population, 43,070.

Duccio di Buoninsegna (*dŏŏt'chô dē bōō-ō'nēn-sän'yä*), also known as Duccio di Siena, was born about 1260 and died about 1320. He was the Italian painter who founded the Sienese school. His great picture is the altar-piece of the Madonna in the cathedral at Siena. When completed, the delighted people carried it in a procession to the church

Du Chaillu (*dü shȧ′yü′*), **Paul Belloni,** a distinguished traveler, was born at Paris, in 1835. He was educated at a Jesuit institution on Gabun River in West Africa, where he was for many years a trader. He came to the United States in 1852 and was naturalized, writing about the same time a number of letters on the Gabun country to the New York *Tribune.* He set out on an exploring expedition to West Africa, in 1855, spending four years, and traveling 8,000 miles on foot, with no companions. On his return he published an account of his expedition, called *Explorations and Adventures in Equatorial Africa,* in which he gave much valuable information about the country and its people. Several years later he made a second expedition to the same region. He wrote several books for young folks, among which are *Gorilla Country, Wild Life under the Equator, Lost in the Jungle, The Country of the Dwarfs, Land of the Midnight Sun* and *Age of the Vikings.* He died on May 1, 1903.


PAUL B. DU CHAILLU

Duck, a large swimming bird, with short legs and webbed feet. The duck-family embraces swans, geese and ducks. The ducks proper are divided into fresh-water ducks, sea-ducks and fishing-ducks. The river-ducks or fresh-water ducks feed in shallow water by tipping. They embrace the mallard, blue-winged and green-winged teals, pintail, wood-duck and others. The common domestic duck is descended from the mallard. The bay or sea-ducks are divers, and descend deep into the water for their food. They are the canvasback, red-head, broad-bill, eider-duck and others. Both these kinds of ducks have bills with roughened margins, that form a sort of strainer. In gathering their food, which consists of small mollusks, crustacea and seeds, they also take in considerable mud. They close the bill and force out the mud through the little spaces along the margins, retaining the food. The merganser or fishing-duck feeds on fish, and stands by itself. Most of the ducks nest in the north, and are hunted during the short period they rest and feed in our waters on their way north and on their return south. The black and the wood-ducks nest in the United States. As game-bird the mallard is unsurpassed, not outrivalled by the famous canvasback. They are almost vegetarians, eat sparingly of fish and other animal food. The haunt of the mallard—also called wild duck, also greenhead—is small lake or sluggish stream where wild rice and rushes grow. Here in August and September they harvest their favorite grain, and here the sportsman tries to harvest them. Ducks fly with great rapidity, are shy and like to fly. The duck lays her eggs, pale-blue or greenish-gray, six or a dozen in number, in a ground nest made of wild hay, leaves, etc. and lined with down from her breast. She very seldom leaves her nest during the 28 days of incubation; when she does, draws the down over the eggs to keep them warm. Many of the young fall prey to the duck-hawk, to water rats and large pike.


MALLARD-DUCK

Duckbill or **Duck-Male,** a peculiar mammal living in the waters of Australia. These mammals are about 18 inches long, covered with fine fur, and have webbed feet. They have a very broad, horny bill something like the bill of a duck. They burrow from under the water into the bank, and, coming above the water-level, form chambers in which they live. These are often found among the roots of a large tree. They are egg-laying mammals. The eggs are laid in an internal pouch of the mother and hatched there.

Ducking-Stool, an instrument once used for punishing scolding wives. It was made in various ways, often consisting of a chair fastened to the end of a beam, which could be lowered and raised. The woman was fastened securely in the chair, and the beam was then lowered into the water on the see-saw principle. The practice of ducking began in the latter part of the 15th century, and was common in England and America until the early part of the 18th century.

Dudevant. See SAND, GEORGE.

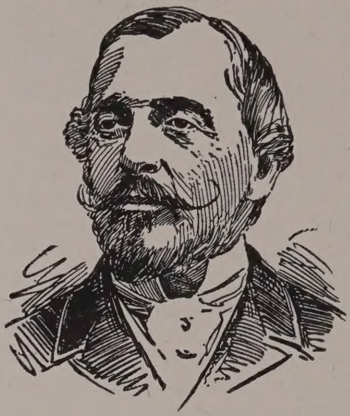
Dudley, Robert. See LEICESTER.

Dueling, from a Latin word meaning two men's battle, is a custom which has been common in many countries. The old ordeal by battle was a duel or judicial combat in which, instead of having a case argued in court as now, the two men fought before the judge, the one who was victorious being thought to have proved that he was in the right. Probably from this custom the modern duel arose. France is the country in which duels have always been most common. It was thought to be the part of a gentleman to resent any insult to his honor, and the most foolish and trivial things were considered insults. Duels were not common till the 16th century, and it is probable that the custom arose from the habit of wearing swords as a part of the ordinary dress, a custom introduced in the 15th century. In England many of the foremost statesmen in the early part of the 19th century fought duels, among them being such men as William Pitt and the Duke of Wellington. The most famous American duel was that between Hamilton and Burr, in which Hamilton was killed. This duel greatly roused the people of the country against the system, and duels became much less common. In Germany the university-students still keep up the practice, and think that a sword-scar across the face is a mark of honor. Dueling is also common in the German army, and is not forbidden by law. It was abolished in the English army in 1844. See *History of Dueling* by Dr. Milligen and *Dueling Days in the Army* by William Douglas.

Dufay (*dü-fā'*), **Charles François**, born Sept. 14, 1698; died July 16, 1739. He is distinguished especially as being the man who first discovered that there are two kinds of electricity, which we now call positive and negative. His electrical experiments are described in six memoirs published by the French Academy during 1733-4.

Duff, Alexander, a great Scottish missionary to India, was born April 26, 1806, in Perthshire. He was the first missionary sent from the Church of Scotland to India. On the passage he was twice shipwrecked, but reached India in May, 1830. He devised a new plan of missionary work among the natives, giving them instruction in all branches of knowledge as well as religious teaching. The college which he founded was very successful, and after a few years had from 600 to 700 pupils. Ill-health forced him to return to Scotland for a time, but he returned to India later and continued his work. In 1843, owing to changes in the Church of Scotland, Dr. Duff abandoned his college. In 1844 he helped to start the Calcutta *Review*, but had to go home in 1849. Some years later he made a missionary tour through America, which was very successful. Some time after he went to India again, where he was one of the founders and for some time the real head of the University of Calcutta. He died at Edinburgh in 1878, leaving his money to found a missionary lectureship. His knowledge of the affairs of India was so great that his opinion was often asked by the English government. Probably no one has done more to arouse missionary enthusiasm than he, and his introducing European education and methods of study among the natives was the beginning of a real advance in the social life of that country. See *Life* by Professor Thomas Smith.

Dufferin, Frederick Temple, Hamilton Blackwood, Marquis of, was born in Florence, Italy, in 1826. His mother was the grand-daughter of Sheridan and noted for her beauty as well as for her gifts as a song-writer. He was educated at Oxford University. Between 1860 and 1872 he held several prominent positions in the English ministry, and in 1877 was appointed governor-general of Canada. In this position he was very successful, the great development of Manitoba during his administration being especially noticeable. In 1879 he was made ambassador to Russia, and later held a similar position at Constantinople. After the rebellion of Arabi Pasha, in Egypt, Lord Dufferin was sent to restore order, and was successful in effecting several reforms in the management of Egypt. In 1884 he became viceroy of India, where his term of office was memorable for the successful arrangements with Russia regarding the frontier of Afghanistan and for the annexation of upper Burma. In 1888 he resigned, and was appointed minister to Rome and created a marquis. His last appointment was as British ambassador to France, retiring finally in 1896. His unfortunate connection as chairman of a corporation for company-promoting in London clouded his later years and did much to hasten his death. He is the author of *Letters from High Latitudes*, descriptive of a yacht voyage to Iceland; *Irish Emigration* and the *Tenure of Land in Ireland; Speeches and Addresses; Speeches in India* (1890) See his *Life* by Sir Alfred Lyall (London, 1905). The Marquis's wife, Lady Dufferin, wrote two delightful books, entitled; *Our Vice-Regal Life in India* (1890) and *My Canadian Journal* (1891), besides the narrative of her philanthropic work in India: *The Record of Three Years' Work* (1889).



MARQUIS OF DUFFERIN

Duffy, Hon. Sir Charles Gavan, statesman and man of letters, was born in Monaghan, Ireland, April 12, 1816, and educated at Belfast Institution. In 1842 he founded *The Nation*, a newspaper, in Dublin, was tried for seditious conspiracy in company with Charles O'Connell and others the following year, but was released on a writ of error to the House of Lords. In 1842, together with Thomas Davis and John Dillon, he founded the Dublin *Nation*, the organ of the Young Ireland party. Four years later, after several quarrels within the Young Ireland party, the group was reorganized as the Irish Confederation. In 1848 Duffy and other members of that body were tried for treason, but won acquittal. In 1852 he was elected to Parliament, defeating the Chief Secretary. Duffy resigned and went to Australia in 1856. In the following year he became Minister of Public Works in the first responsible government of Victoria. In 1871 he became Prime Minister. He was unanimously elected Speaker in 1877. He returned to Europe in 1880 and lived in Nice until his death on February 9, 1903.

In his youth, Duffy was a noteworthy poet and his love for literature was evident throughout his entire life. *The Ballad Poetry of Ireland,* published in 1845, has gone through more than fifty editions. *Young Ireland: A Fragment of Irish History,* published in 1880, and *My Life in Two Hemispheres,* were widely read. Among his other writings are *Conversations with Carlyle; The League of North and South; Life of Thomas Davis,* and *A Bird's-Eye View of Irish History.*

His eldest son, John Gavan Duffy, born in Dublin on October 15, 1844, and educated at Stonyhurst and Melbourne University, has held many important positions in the government of Victoria. He has served in the capacity of Minister of Lands and Agriculture, Post-Master General, and Attorney-General.

Dukhobors (*do͝o-kŏ-bôrz′*), a Russian religious sect. The name signifies Spirit-fighters, and was given to certain Russian peasants because they denied the divinity of the Holy Spirit. Indeed, they also denied that Christ is more than a superior man, who is reincarnated often, appearing in the persons of the founders of this sect and also in many other people at different times. The sect was established as early as 1750, in the province of Kharkov, in south-central Russia. Dukhobors have no church-building, and will not enter churches, saying that wherever two or three are gathered together a religious congregation exists. They have no ceremonies, even at marriages. Their religious views are handed down orally which they term the "Book of Life." The Ten Commandments they accept, and whatever else in the Bible seems to them to be useful. They are governed by an assembly of elders, and usually are quiet people, sober and hard-working. They are peasants, all of them. From 1750 to 1793 the sect grew so rapidly that the Russian government began a persecution. In 1800 this policy was changed to one of kindness. Large tracts of fertile lands in central Russia were granted the industrious peasants. In 1819 persecution was renewed, and they were removed to a less favorable district. In 1890 Pobiedonostseff began to apply to them his policy of forcing all Russians into the Greek church. The Dukhobors then begged permission to emigrate. Some were allowed to go to Cyprus; and a large body emigrated to Manitoba, where they still live. Their prosperity in that country continued until 1902, when large numbers of them started in the dead of winter in an aimless march, hoping somehow to find Christ. The Canadian government was finally obliged to drive them home to preserve their lives. In 1903 and again in 1908 the same thing occurred, women and children joining in the march. In 1933 the Dukhobors again caused some disturbances in Canada, but were soon subdued by the authorities.

Dulcimer, an ancient musical instrument which looks like a flat box, with wires run across, and tuned by pegs at the sides. It is played by striking the wires with a small piece of wood in each hand or, more usually, with two cork-head hammers. It is one of the most ancient of instruments, and may be regarded as the ancestor of the piano.

Duluth (*do͝o-lo͞oth′*), a city and the seat of St. Louis County, Minnesota; and the chief lake port of the state. It is situated at the western end of Lake Superior, 156 miles northeast of St. Paul, and 410 miles west of Sault Ste. Marie. Superior Harbor, which is open for eight months annually, has been for many years second only to New York in gross annual tonnage of North America ports. It is completely landlocked, and protected by Minnesota Point, a crescent-shaped sand pit about seven miles long. Duluth is located on land which slopes upward from this harbor through the main and beautiful residential section, which is between 300 and 400 feet above the lake, to an elevation of 850 feet. The city covers an area of sixty-seven square miles, with a harbor area of nineteen square miles. The natural beauty of Duluth is unexcelled in America. It is noted for its lovely hillside exposure, its flowers, and its beautiful drives, affording twenty-five miles of scenic highway within the city. Duluth is the seat of Protestant Episcopal and Roman Catholic bishoprics. The State Normal School is also located there.

The climate is tempered by Lake Superior, and is especially beneficial to hay fever patients. Summers are cool, fine autumn weather prevails until Christmas, and winters are moderately cold, dry, and invigorating.

Duluth is the natural shipping point of the northwest, and a manufacturing and wholesale center. It is served regularly by thirteen railroads, of which it is the terminus of three, and thirty-two steamship lines. There is a large municipal airport. St. Louis County, of which Duluth is the seat, contains eighty-five per cent of all the iron ore in Minnesota. The Minnesota Iron Mines, directly outside of the city, have reserves of 1,400,000,000 tons. There is cheap and unlimited hydroelectric power from the St. Louis River. A rich dairying and gardening hinterland completes the resources of the city. Its manufacturing industries number almost 200. The chief industries include steel and iron ores and products, coal, flour, salt, cement, fisheries, cereals, carbide, sheet metal, woolens, linens, knit goods, matches, lumber, refrigerated meats, farm and dairy products.

The city is named for Daniel Greysolon, Sieur du Luth, who held a great Indian Council and raised the French flag there in 1769, beginning the visits of traders, explorers, and missionaries. John Jacob Astor established an important fur trading post at Fond du Lac, now a part of Duluth, in 1817. In 1855, the region was opened to white settlement. Duluth was plotted in 1856, and incorporated in 1857. It has since absorbed a number of villages and towns. The commission form of government was adopted in December, 1912.

The residents of Duluth are chiefly of Scandinavian descent. The population, which was 3,483 in 1880, had increased to 52,909 in 1900, to 98,917 in 1920, and according to the census of 1930, now numbers 101,463.

Duma, The, was the elective state-council of Russia and (with the Council of the Empire) the legislature of the empire. It originated in consequence of the revolutionary activity of the Russian people during and after the Russo-Japanese War (1904-05). On August 6, 1905, it was created by Emperor Nicholas II, and on October 17 a law was promulgated establishing as an unalterable rule that no law shall take effect without the *Duma's* approval and that to those whom the people elect shall be guaranteed real participation in controlling the legality of the acts of such authorities as the emperor appoints. It consisted of members elected for five years and representing the ninety-seven provinces and the twenty-eight largest cities. The election of the deputies is indirect, being made by electoral bodies themselves chosen by elective assemblies. On March 6, 1906, changes were made in the constitution of the *Duma.* It received equal legislative powers with the Council of the Empire and the same right of initiative in legislation and of putting questions to ministers. Every measure before being submitted to the emperor was required to be passed by the *Duma* as well as the Council. Any measure rejected by the *Duma* or by the Council was not even laid before the tsar. The *Duma,* like the Council, had the right to annul the election of any member. The sittings of both bodies were public. Debates might be ended by decision of the majority. The *Duma* was not empowered to receive petitions or deputations. Ministers of the government might be elected to the *Duma* to vote as members. The legislators were paid five dollars a day during sessions, received traveling expenses, had personal immunity during sessions, and were liable to arrest only with *Dumas's* permission. Bills rejected by the tsar could not again be brought forward during the same session, nor those rejected by it be brought forward again without the tsar's consent.

Dumas (*dü'mȧ'*), **Alexandre,** a celebrated French writer, was born in 1802. He was brought up in a country-town, and when about 21 went to Paris to seek his fortune. He began to write plays, and soon his *Henry III* gained him a great reputation in Paris. Soon after, he visited Switzerland and wrote for a magazine his impressions of the journey. This work was also successful; but it was his *Monte Cristo* which made his reputation world-wide. This was soon followed by his no less famous *Three Musketeers.* After these works he undertook to write a large number of stories, any one of which was enough to keep an ordinary man busy. In order to do this work, he hired several young writers, and when they had written the first draft of a story, Dumas worked it over and had it published under his own name. This brought him into disrepute, but he kept on in the same plan. He was extravagant in every way, and after engaging in several wild schemes, one of which was joining Garabaldi in 1860, he lost all his fortune and died in 1870.

Dumas, Alexandre (known as Dumas the younger), French novelist and dramatist, was born at Paris, July 28, 1824, and died there on November 27, 1895. He was the son of A. Dumas *père,* author of *Monte Cristo,* and was educated at the *Collège Bourbon,* in Paris. He began his literary career by publishing, at the age of seventeen, a volume of poems, *Péchés de Jeunesse,* after which he accompanied his father on a tour in Spain and in northern Africa. He created a sensation by the issue of *La Dame aux Camélias,* after which, for nearly 40 years, appeared a stream of novels and writings for the stage, which deal largely with the *demimonde* of Paris. His brighter plays include *Le Fils Naturel, L'Ami des Femmes, Dénise* and *L'Affaire Clémenceau.* He became a member of the French Academy in 1875 and a grand officer of the Legion of Honor in 1894.

Du Maurier (*dü mō'ryā'*), **George L. P. B.,** a naturalized British artist, notable for his sketches in London *Punch,* was born at Paris, on March 6, 1834, and died at London, on October 8, 1896. Settling early in London, after studying art in Paris, he began to contribute sketches to *Once a Week,* to *Cornhill Magazine* and to *Punch,* subsequently joining the staff of the latter, the pages of which he enriched with caricature sketches of society-life as typified in London high life. He also illustrated Thackeray's *Esmond* and *Ballads,* and in 1891 appeared as a novelist and lecturer. His novels, which were illustrated by his brush, include *Peter Ibbetson, Trilby* and *The Martian.*

Dumouriez (*dü'mōō-ryȧ*), **Charles François,** a general during the French Revolution, was born in 1739. When the revolution broke out, he joined the popular party, and in 1790 was appointed commander at Nantes. He was then named minister of foreign affairs, but resigned the position to take command of one of the French armies; and it was largely by his startegy that France was victorious over the allies then. He gained the battle at Volney and overthrew the Austrians at the great victory of Jemappes, but was defeated by the Austrians in 1793. The revolutionists at Paris did not trust his loyalty to their cause, but denounced him as a traitor and summoned him to Paris. In order to save his life, he gave himself up to the Austrian general. He finally settled in England as an exile, and died there in 1823.

Düna. See Dwina.

Dundee, a city and seaport, is situated on the River Tay, ten miles from its entrance to the sea, and fifty-nine miles from Edinburgh, Scotland. It has a water frontage of four miles, a fine harbor and excellent docks. An iron bridge, more than two miles long, spans the Firth at its entrance. There are many beautiful buildings, among which are the town hall, erected in 1734 with a spire 140 feet high; the Albert Institute; the Royal Exchange, erected in 1853-56; the Town Churches, erected three under one roof, with an old tower, 156 feet high, which was restored in 1873; St. Paul's Episcopal Church, with a spire 211 feet high; and University College, affiliated with St. Andrews University. Dundee is the chief seat in Great Britain of the manufacture of coarse linen fabrics. Coarse cloth from jute, such as bagging and carpets, is also carried on extensively. Dundee also is famed for its confectionery which is sent all over the world, and for marmalade. Exports include textiles, machinery, millwork, and spirits. Formerly the city was important for whale and seal fishing, and there is now some shipbuilding. Dundee was made a royal borough by William the Lion about 1200. Its strong fortifications made it important in the Scottish and English wars. John of Gaunt partly destroyed it in 1385, Montrose pillaged it in 1645, and General Monk sacked it and burned it in 1651, massacring 1,000 of the inhabitants. It was called the "Scottish Geneva" from the part it played in the Reformation. It is famed for the inspired lines *Up with the Bonnets of Bonnie Dundee!* The population in 1931 was 175,583.

Dunedin, a seaport and capital of the Province of Otago, South Island, New Zealand, and the most important city commercially in that country, is situated on Otago harbor, on steep hills on the eastern shore of the island. It has many handsome buildings, including those of Otago University, of which it has been the seat since 1871. It is also the see of an Anglican and a Roman Catholic bishopric. The United States maintains a resident consular agent there. The most important manufacture and export is wool and its products. Much gold is mined near Dunedin, and grain, potatoes and cold storage meats are also exported. The city was founded in 1848 by settlers of the Free Church in Scotland, and grew rapidly, especially after the discovery of gold in 1861. The population is 85,000.

Dunkards, Dunkers or **Church of the Brethren,** a large sect of German Baptists organized in Westphalia in 1708. The word is derived from the German *tunken,* meaning *to dip.* Alexander Mack was the first minister. The Dunkards somewhat resemble the Quakers in their religious beliefs, which are very strict. They live and dress plainly. They hold it wrong to fight or take an oath. They came to America early in the eighteenth century, and were established in Pennsylvania by 1730. In the eighteenth century they expressed themselves against slavery, and especially against the slave-trade. In 1883 they divided: the Old Order clung to older forms of dress and opposed higher education, while the Progressives preserved the spirit of their faith, but tended to conform somewhat to the need for outward changes. An offshoot of the Brethren, known as the Seventh-Day Dunkards, keep the seventh day as the Sabbath instead of the first. Their religious paper, the *Gospel Messenger,* has a wide circulation.

Dunkirk (*dŭn'kûrk*), or **Dunkerque,** a fortified seaport and the capital of an arrondisement in the Department of Nord, is situated on the Strait of Dover in France, twenty-eight miles northeast of Calais. It is a town of great strength. The ramparts are part of an extensive system of fortifications, and ditches provide for the easy flooding of the surrounding country. The harbor is approached by a natural roadstead which floats the largest vessels. There are four dry docks, and quays over five miles long. Dunkirk ranks third among French seaports. It has a fine museum, art gallery and public library. Shipbuilding is an extensive industry. There are also manufactured linen and leather goods, soap, starch, beer, beet sugar, cordage, and metal foundry products. There are large cod and herring fisheries. Saint-Eloi built a church in the seventh century in the midst of a waste of sand hills from which comes the name of the city, "Church on the Dunes." It was ruled successively by Burgundy, Austria, and Spain; burned by the English in 1388; captured by the French in 1658 and given to the English, and sold to Louis XIV in 1662. The Treaty of Utrecht compelled the French to destroy its fortifications in 1713, but they were restored in 1783. In the World War, Dunkirk was constantly attacked by German forces, chiefly from the air, as it was an important antisubmarine depot. In September, 1916, the Germans shelled it from a distance of twenty-two miles. The population is 38,891.

Dunkirk, a city and port of entry, is situated in Chautauqua County, New York, on the southern shore of Lake Erie, and forty-one miles south of Buffalo. It is the second largest city in the county. Dunkirk has an excellent harbor protected by a breakwater, and carries on a large lake trade. Over 8,000 carloads of grapes are annually shipped from there. Manufactures include locomotive works, axe and steel factories, radiator and gas-engine works, planing mills and shirt factories. It was settled in 1809, incorporated as a village in 1837 and a city in 1880. Its population, according to the census of 1930, is 17,802.

Dunmore, a town in Lackawanna County, is situated in northeastern Pennsylvania, two miles north of Scranton. It is in the center of the rich anthracite coal region of the Lackawanna Valley. There are also extensive brick, stone, and silk interests in this region. It is served by the Erie and Wyoming Valley Railroad. Dunmore was settled in 1835 and incorporated in 1862. Under the charter of that year, the government is vested in a burgess, elected every four years, a borough council, and administrative officials. In 1930 the population was 22,627.

Dunne, Finley Peter, an American journalist and humorist, popularly known as Mr. Dooley, was born in Chicago, Illinois, in 1867. After obtaining a common-school education he began his career as a reporter, subsequently rising to the post of city-editor, a member of the editorial staffs of the *Times, Times-Herald* and *Evening Post,* and finally editor-in-chief of the *Evening Journal.* His "Dooley" sketches, which have made the writer widely known, first appeared in the Chicago *Times-Herald,* the prototype of the humorous commentator on political and social themes being a Chicago saloon-keeper who died in 1901. The Spanish-American War gave Dunne a notable theme for the exercise of his peculiar philosophy mixed with satire; while he widened his audiences by his publications, which include *Mr. Dooley in Peace and in War* (1898); *Mr. Dooley in the Hearts of his Countrymen* (1898); *Mr. Dooley's Philosophy* (1900); *Mr. Dooley's Observations* (1902), and *Mr. Dooley Says* (1900).

Dunstan, St., archbishop of Canterbury, was born in Glastonbury in 924 A. D. He was educated at the abbey of Glastonbury and became a monk there, giving himself up to study and music. Dunstan soon after went to the king's court and was appointed abbot of Glastonbury. His abbey soon grew to be a famous school, but Dunstan did not give all his time to it; he became the chief adviser of King Edmund. When the young Edwy became king, Dunstan lost favor, but was soon called back by Edgar, who had become king of the country north of the Thames. After Edwy's death Edgar became king of the whole country and Dunstan was made archbishop of Canterbury. He died at Canterbury in 988.

Dupleix (*dü'plȧ'*), **Joseph François, Marquis**, a celebrated governor of the French East Indies, was born in 1697. His father was a shareholder in the French East India company, and had his son appointed to a position in India. Ten years later he became superintendent of Chandernagore in Bengal. He was so successful that he was soon appointed governor-general of Pondichery, including all the French Indies. He was so skillful in managing the native chiefs that the Carnatic soon became almost a French province. When war broke out between England and France, Dupleix was for a time successful against the English; but his plans were finally frustrated by Lord Clive. In 1754 England and France came to an agreement regarding India, and Dupleix was recalled. He died in 1764.

Dupont (*dû-pŏnt'*), **Samuel Francis**, an American naval officer, was born at Bergen Point, New Jersey, in 1803. He entered the navy in 1815. Thirty years later he was promoted to the rank of commander. In the summer of 1861 he was given command of the Atlantic blockading squadron. He also commanded the expedition which captured Port Royal harbor, in the same year. He was made rear-admiral in 1862, and the next year commanded the fleet of ironclads which attacked Sumter, where he was defeated. In 1863 he resigned his command. He died at Philadelphia in 1865.

Du Pont, Thomas Coleman, an American capitalist and former United States Senator, was born in Louisville, Kentucky, in 1863. He was educated at Urbana University and the Massachusetts Institute of Technology. He entered upon an engineering career, and became interested in coal and iron mining in Kentucky. In 1893 he became general manager of the Johnstown Steel Company in Pennsylvania. From 1902 to 1915 he was president of the great powder company founded by his grandfather, Eleuthere Irénée du Pont de Nemours, and named for him. He purchased a controlling interest in the Equitable Life Assurance Company and erected the Equitable Building in New York. He owned many hotels. He built at his own expense a $5,000,000 paved highway extending the length of Delaware and presented it to the state. In 1908 he was made a member of the Republican National Committee, and in 1921 appointed to fill a vacancy in the United States Senate. He was elected to the Senate for the 1925-31 term, but failing health caused his resignation in December, 1928. He died in 1930.

Duquesne (*dōō-kān'*), a borough in Allegheny County, Pennsylvania, is situated on the Monongahela River, about ten miles from Pittsburgh. It is served by the Pennsylvania Railroad. There are extensive steel works and blast furnaces located here. The city, which was settled in 1885 and incorporated in 1891, had a population in 1930 of 21,396.

Duration in Plants. The variation in duration among plants is extreme. Some of the simplest of plants may endure but a few days or even less, while certain trees are known to endure for several centuries. Among seed-plants an attempt has been made to classify duration roughly under three heads, namely, annual, biennial and perennial plants. The annual plant lasts but a single growing season, but even within that limit there are great differences in actual duration. There are annual stems which are put up year after year by perennial roots or underground stems. A true annual is a plant which disappears completely at the end of the season, and continues over to the next only in the form of a seed. The name biennial has been given to those plants which form foliage one season, put up a flower-stalk the next, and then disappear. The radish, turnip and the like are good illustrations; but under cultivation they have been made to go through their whole life-history in one season. Perennial plants are those which endure season after season, and of course differ widely from one another in the number of years involved in their duration. In general, annual and biennial plants belong to the same category, for they are comparatively transient forms. The perennial plant is the one which really endures, whether in the form of underground parts or in aerial parts which endure, as in shrubs and trees. The ephemeral habit, which consists of the disappearance of plants in one or two years, to be carried over to a subsequent growing-season by seeds, is a habit which has resulted in protection against an unfavorable season. In any region, therefore, where a season of cold or of drouth comes regularly, many plants have developed as annuals and biennials, or, in other words, have developed the ephemeral habit. The perennial habit involves an unusual development of protective structures, which the ephemeral habit avoids.

Dur'ban, the seaport and, with Pietermaritzburg, the chief town, of Natal, South Africa. It is situated on a landlocked tidal bay, accessible for all vessels; a railroad runs inland from it throughout the colony. The town was laid out by a colony of Dutch burghers in 1842, and derives its name from Sir Benjamin D'Urban, once governor of the Cape. Pietermaritzburg, the capital (population 31,199), lies about 60 miles northwestward. Durban is one of the trade-gates of South Africa, and figured prominently as the landing-place of the British forces in Natal operating against the Boers. A large population of the town are Kafirs. The number of its inhabitants is 59,000.

Dürer (*dū'rēr*), **Albrecht,** the most celebrated artist of Germany, was born at Nuremberg in 1471. He was apprenticed to a painter in his native town, and, some years later, after a period of travel, married and settled as a painter at Nuremberg. He soon after began designing on wood and engraving on copper, and many of these pieces still exist. In 1505 he proceeded to Venice, and after his return painted his *Adam and Eve,* which is now at Florence, and his *Assumption of the Virgin,* one of his finest works, but part of which has since been burned. He was much employed by Emperor Maxmilian I. In 1520 he went to the Netherlands and painted the portrait of Erasmus, and while there he was appointed court-painter by Charles V. He died at Nuremberg in 1528. Besides being the greatest of German artists, Dürer ranks even higher as an engraver on metal and as a designer of woodcuts. The most celebrated of his copperplates are the *Little Passion* and *St. Jerome in His Study;* and of his woodcuts, *The Greater Passion, The Little Passion* and the *Apocalypse* are the best known. See *Albert Dürer,* by Thausing, English translation by F. A. Eaton.

Durham, John George Lambton, First Earl of, was born at London, April 12, 1792, was in the house of commons from 1813 to 1828, and lord of the privy seal in 1830. He aided in preparing the first reform-bill, was successively ambassador to Russia, Austria and Prussia, and was appointed high commissioner for the settlement of the troubles of Canada and governor-general of the British provinces in North America on March 31, 1838. He immediately set himself to ascertaining the causes of the widespread troubles. To each province he sent a commission of inquiry, and called into conference the governors of Nova Scotia, New Brunswick, Newfoundland and Prince Edward Island. It was then that the future confederation of the Canadian Dominion had its first great impetus. A scheme of union between Upper and Lower Canada was also worked out, and a masterly report on the condition of affairs prepared and presented to Parliament. The adverse criticism caused by his proclamations of amnesty led to his sudden resignation. He died at Cowes, on the Isle of Wight, July 28, 1840.

Durham (*dŭr'am*), an ancient English city, near the center of Durham County, is built around a steep rocky hill, which is nearly encircled by the River Wear. On the top of the hill, which is partly inclosed by old walls, are the castle and cathedral. Durham arose about 995, when a church was built to enshrine the bones of St. Cuthbert. In 1093, on the site of this old church, was commenced the present cathedral, one of the finest specimens of Norman architecture in Great Britain. The castle, once the residence of the bishops of Durham but now occupied by Durham University, was founded in 1072 by William the Conqueror, but has been much changed since. The dormitory of the monastery of Durham, now the university library, is one of the finest in England. The bishopric of Durham extends over the entire county, and has had many celebrated men as bishops. The present university, which has a small attendance, was opened in 1833.

Duse, Eleonora (1859–1924), Italian actress of note, was born at Vigevans, on the border of Piedmont and Lombardy, and first appeared on the stage when but 13. She early became a favorite with Italian playgoers, playing in Florence, Naples and Milan. Later on she appeared at Vienna, Berlin, Paris and London, achieving triumphs in various rôles, such as Juliet, Marguerite, Magda, Camille, Francesca da Rimini, Paula in *The Second Mrs. Tanqueray*, Santuzza in *La Cavalleria Rusticana*, etc., etc. In 1893 she appeared at New York as Camille. She revisited this country nine years later, where her talent and, especially, her great dramatic power were enthusiastically recognized and praised. In the Old World her triumphs have also been many and especially her acting of Mirandolina in Goldoni's *La Locandiera* and in the heroines of Gabriele d' Annunzio's *Gioconda* and his *Francesca da Rimini.*

Düsseldorf (*düs'sel-dôrf*), the chief town in the district of the same name in Rhenish Prussia, is situated on the right bank of the Rhine, at the mouth of the Düssel. The streets are large and regular and planted with trees, while the large number of squares and tasteful parks greatly helps the appearance of the city. Of late years the trade and industries of Düsseldorf have largely increased, the iron and cotton-industries being important, as are also manufactures of pianos, paper, soap and beer. The city is specially noted as a center of art. The Düsseldorf Academy, under the management of well-known artists, was celebrated during the first half of the 19th century. The art-hall contains a gallery of modern etchings. The famous picture-gallery, founded in 1590, was in part removed to Munich in 1805. Several of the churches are old and full of interest, and the city has one of the finest public gardens in Germany. Population, 357,702.

Dutch East India Company. This company was formed in 1602 by the union of several smaller companies to secure a monopoly of the Dutch trade to the East Indies. During the long war with Spain and Portugal the Dutch Company managed to deprive Portugal of all its possessions in the East Indies. The company established a valuable colony at the Cape of Good Hope; and took Ceylon from Portugal in 1658. In spite of English and French competition the Dutch Company was very successful, especially during the seventeenth century, when its dividends ranged from 12 to 63 *per cent.* But the proclamation of the Batavian Republic under French control in 1795 put an end to the existence of the company, which had during the 18th century at times required state-support. The English had already driven the Dutch Company from India and crippled its trade. But in 1815 many of the possessions of the Dutch East India Company were restored to Holland.

Dutch Republic, The, was founded by the union of the seven northern provinces of the Netherlands, during the long and heroic war against Spain for freedom of religion and government. These provinces, Holland, Zeeland, Utrecht, Gelderland, Groningen, Overyssel and Friesland, formed their union in 1579 and declared their independence in 1581. The war of liberation became a fierce crusade. The Netherlands had been a province of the German Empire under Charles V; but under Philip II they were no more than a province of Spain, and the rooted idea of Philip was to stamp out heresy from his dominions. In 1567 he sent the Duke of Alva with a Spanish army to the Netherlands; and among the victims of the persecution that followed were Counts Egmont and Hoorn. But in 1586 the Prince of Orange entered the field with a small army; and so began the forty years' struggle for freedom. At times the Dutch were helped by France, at times by England; but it was the great courage and faith of the people that in the end won their liberty. In 1581 William of Orange was made ruler of Holland and Zeeland; but in 1583 he was murdered at Delft. Maurice of Nassau, the son of William of Orange, at length won a decisive battle in 1600 at Nieuport. Meantime the Dutch fleets had seized the Portuguese and Spanish settlements in the East Indies. A 12 years' truce in 1609 practically granted the independence of the Dutch Republic, which entered upon a period of prosperous trade and of naval and commercial rivalry witn England. The Dutch East India Company was founded in 1602; and the Dutch West India Company, which controlled New Netherlands (New York) in 1621.

After the 12 years' truce with Spain expired, war was renewed, but was ended in 1648 by the Peace of Westphalia. The greatest days of Holland were those of its naval successes against England in the wars of 1652 and 1665; but the English fleets in the end proved too strong. In 1688 the stadtholder of Holland was called to the throne of England as William III. Holland now became one of the foes of Louis XIV. Peace was only restored in 1713 by the Peace of Utrecht. Holland then began to be ousted by England from her trade. In 1780 she had a short war with England; and in 1782 was the second power to recognize the independence of the United States. Hitherto the Dutch Republic had been rather aristocratic; but in 1795 the French compelled Holland to accept a new republican constitution as the Batavian Republic. In 1806 Napoleon changed this form of government into the Kingdom of Holland under his brother Louis. In 1810 the country was annexed to France. But in 1813 the French were expelled and the House of Orange restored; and in 1815 Holland and Belgium were united. This was the end of the Dutch Republic. Belgium was made an independent kingdom in 1830.

Duties. See TARIFF.

Dvina. See DWINA.